Hardware Installation Guide for the Cisco 8100 Series Secure Routers

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Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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Preface

Document objectives

This publication describes the installation of the Cisco 8100 Series Secure Routers and replacement or upgrade of field-replaceable units (FRUs).

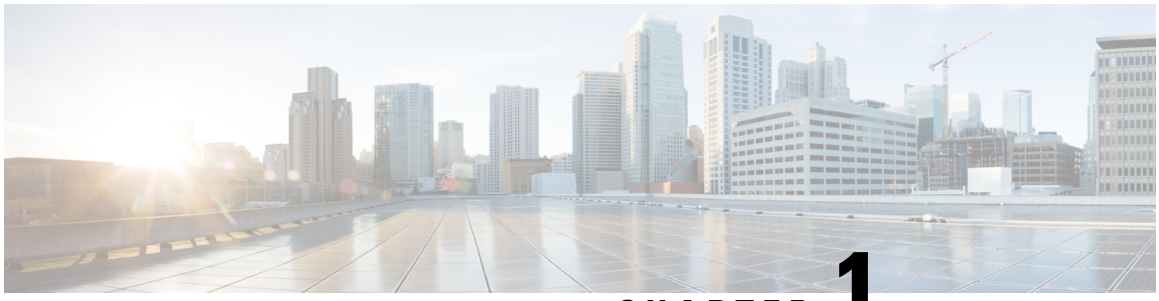
Conventions

Note	Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the document.
Tip	Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.
Caution	Means *reader be careful*. In this situation, you might perform an action that could result in equipment damage or loss of data.
Timesaver	Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Warning IMPORTANT SAFETY INSTRUCTIONS

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

SAVE THESE INSTRUCTIONS



CHAPTER 1

Overview of Cisco 8100 Series Secure Routers

The Cisco 8100 Series Secure Routers offer secure branch connectivity to customers connecting small branch and remote locations to their enterprise networks over a diverse set of interfaces. This allows users and devices at these locations to access enterprise applications hosted at the campus, headquarters, data centers, or the cloud.

About Cisco 8100 Series Secure Routers

The Cisco 8100 Series Secure Routers are the next generation, IOS XE based, multi-core, branch routers. These platforms are fixed with some pluggable cellular options.

Table 1: Base Models of the Cisco 8100 Series Secure Routers

Base Models	LAN Ports Only	WAN Ports Only	Flex L2/L3 Ports	Console Ports	Power Supply	DRAM, Flash	Storage	PoE/PoE+	Cellular Connectivity
C8130-G2	2xGE RJ45	1xGE RJ45 1xGE RJ45/SFP combo	2xGE RJ45	1xRJ45 console	30W/66W	4 GB, 16 GB	USB Type C 3.0	None	None
C8140-G2	6xGE RJ45	2xGE RJ45/SFP combo	2xGE RJ45	1xRJ45 console	66W	4 GB, 16 GB	USB Type C 3.0	None	None
C8151-G2	6xGE RJ45	2xGE RJ45/SFP combo	2xGE RJ45	1xRJ45 console	66W	8 GB, 16 GB	USB Type C 3.0	None	5G Standalone CAT 7 LTE (Pluggable)
C8161-G2	6xGE RJ45	2xGE RJ45/SFP combo	2xGE RJ45	1xRJ45 console	150W	8 GB, 16 GB	USB Type C 3.0	4PoE/2PoE+	5G Standalone CAT 7 LTE (Pluggable)

Table 2: Pluggable Modules of the Cisco 8100 Series Secure Routers

Pluggable Interface Modules	Pluggable Interface Modules Technology
P-5GS6-R16SA-GL	5G Sub-6 GHz Pluggable Interface Module
P-LTEA7-NA	CAT7 LTE Pluggable for North America
P-LTEA7-JP	CAT7 LTE Advanced PIM for Japan
P-LTEA7-EAL	CAT7 LTE Advanced PIM for EMEA, APAC, LATAM

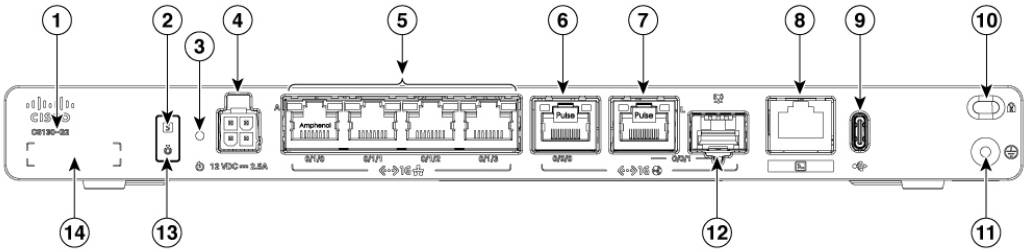
Chassis views

This section contains front and back panel views of the Cisco 8100 Series Secure Routers showing locations of the power and signal interfaces, interface slots, status indicators, and chassis identification labels.

Figure 1: C8130-G2- Rear view

1	System status	2	VPN

Figure 2: C8130-G2 - Front view



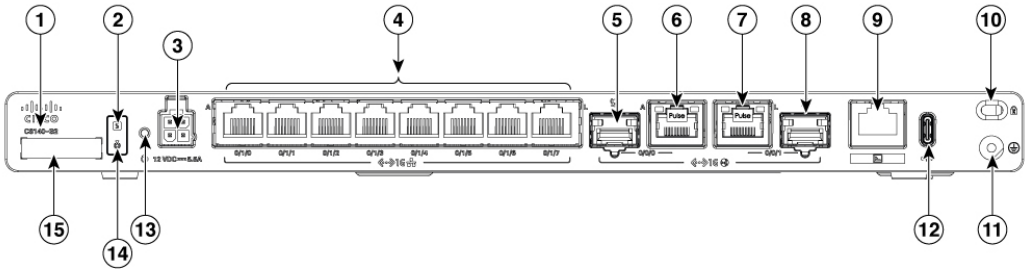
1	Product Identification Number (PID)	2	System status
3	Reset button	4	4-Pin power connector
5	GE RJ45 0/1/0 to 0/1/3	6	GE 0/0/0 - RJ45
7	GE 0/0/1 - RJ45	8	RJ45 console port
9	USB-C 3.0	10	Kensington lock slot
11	Grounding	12	GE 0/0/1 - SFP

13	Blue beacon	14	Serial number

Figure 3: C8140-G2- Rear view

1	System status	2	VPN

Figure 4: C8140-G2 - Front view

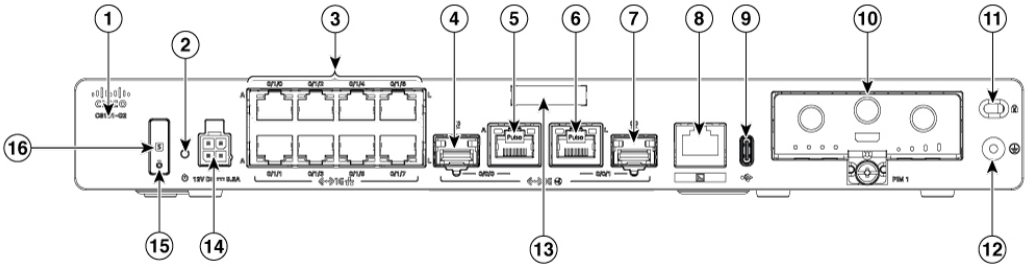


1	Product Identification Number (PID)	2	System status
3	4-Pin power connector	4	GE RJ45 0/1/0 to 0/1/7
5	GE 0/0/0 - SFP	6	GE 0/0/0 - RJ45
7	GE 0/0/1 - RJ45	8	GE 0/0/1 - SFP
9	RJ45 console port	10	Kensington lock slot
11	Grounding	12	USB-C 3.0
13	Reset button	14	Blue beacon
15	Serial number		

Figure 5: C8151-G2 - Rear view

1	System status	2	VPN

Figure 6: C8151-G2 - Front view

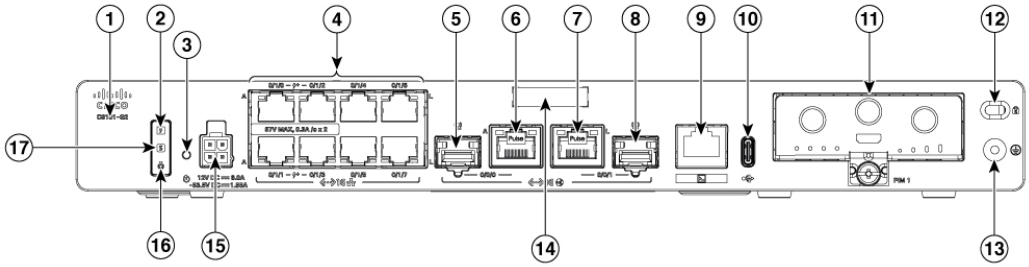


1	Product Identification Number (PID)	2	Reset button
3	GE RJ45 0/1/0 to 0/1/7	4	GE 0/0/0 - SFP
5	GE 0/0/0 - RJ45	6	GE 0/0/1 - RJ45
7	GE 0/0/1 - SFP	8	RJ45 console port
9	USB-C 3.0	10	PIM module
11	Kensington lock slot	12	Grounding
13	Serial number	14	4-Pin power connector
15	Blue beacon	16	System status

Figure 7: C8161-G2 - Rear view

1	System status	2	VPN

Figure 8: C8161-G2 - Front view



1	Product Identification Number (PID)	2	POE status
3	Reset button	4	GE RJ45 0/1/0 to 0/1/7
5	GE 0/0/0 - SFP	6	GE 0/0/0 - RJ45
7	GE 0/0/1 - RJ45	8	GE 0/0/1 - SFP
9	RJ45 console port	10	USB-C 3.0
11	PIM module	12	Kensington lock slot
13	Grounding	14	Serial number
15	4-Pin power connector	16	Blue beacon
17	System status		

Power supply

The product power specifications are specified below:

- AC input voltage: Universal 100 to 240 VAC
- Frequency: 50 to 60 Hz
- Maximum output power: Up to 30W/66W for non-PoE supply and up to 150W for PoE supply.
- PoE and PoE+ (only for C8161-G2)
- Output voltage: +12V for system power and -53.5V for PoE power.
- Dual AC PSU (with RPS adaptor): Supported

Table 3: Power requirements for Cisco 8100 Series Secure Routers

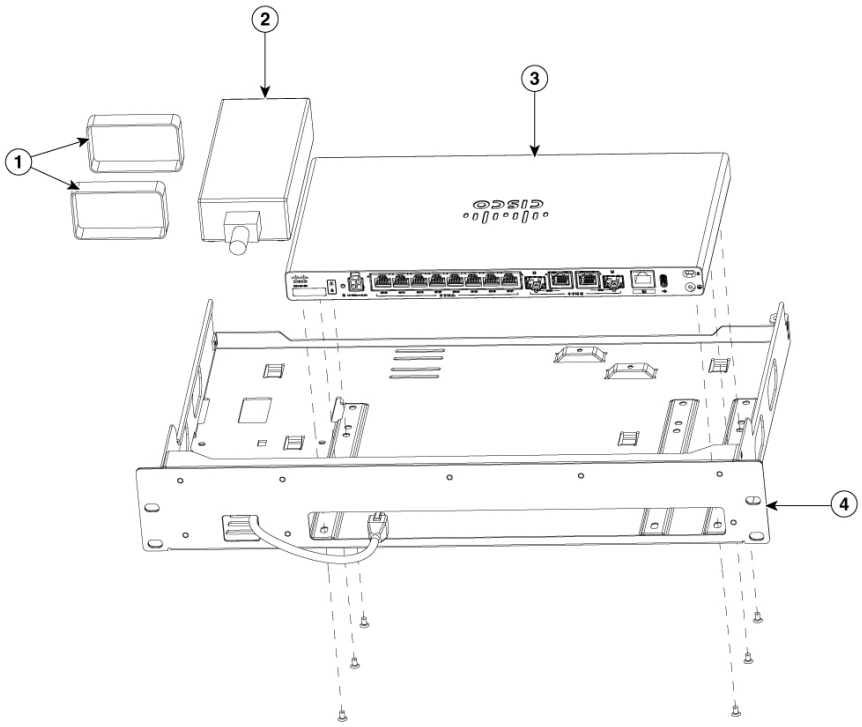
Device supported	Power source	Input rated	Output rated
C8130-G2	30W AC Power Adapter (PWR-CC1-30W)	100-240VAC, 1A	12V, 2.5A

Device supported	Power source	Input rated	Output rated
C8130-G2 C8140-G2 C8151-G2	66W AC Power Adapter (PWR-CC1-66W)	100-240VAC, 2A	12V, 5.5A
C8161-G2	150W AC Power Adapter (PWR-150W-AC)	100-240 VAC, 2.5A	12V 6.0A, -53.5V 1.55A

Install the router with a single PSU on an IPS tray

1. Obtain the IPS tray.
2. Align the router with the mounting holes on the IPS tray as shown in the below figure.
3. Secure the router to the tray using the provided screws.
4. Attach the velcro straps to the power supply unit (PSU).
5. Secure the PSU alongside the router using the velcro straps.
6. Connect the PSU to the router using the power cable.

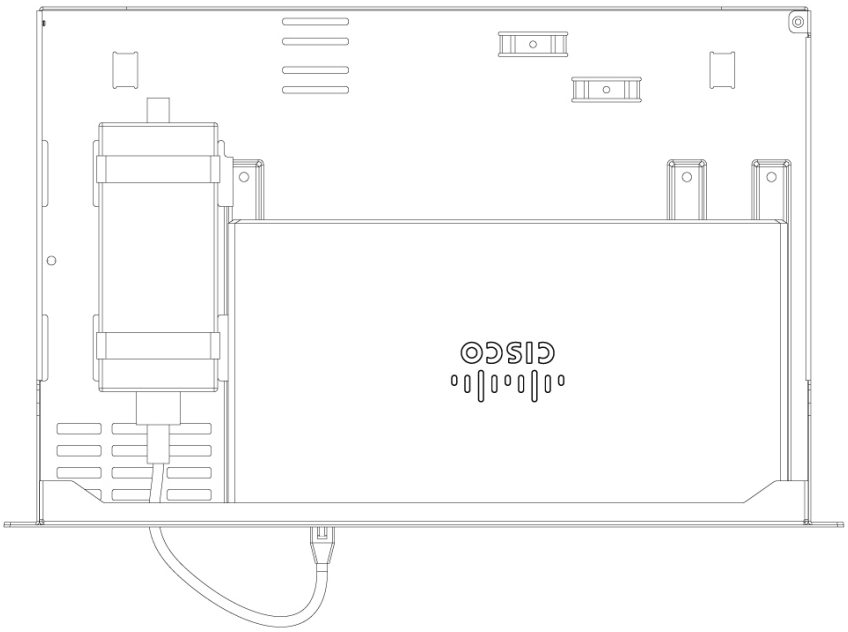
Figure 9: IPS tray installation with single PSU for Cisco 8100 Series Secure Routers



1	Velcro straps

2	Single PSU
3	Router
4	RPS tray

Figure 10: IPS tray attached with single PSU to Cisco 8100 Series Secure Routers



LED indicators

The following table summarizes the LED indicators that are located in the Rear or chassis of the Cisco 8100 Series Secure Routers.

Table 4: LED Indicators for Cisco 8100 Series Secure Routers

Port	LED color	Description
System status (Front and Rear)	Green and Amber	Off—No power.
		Steady Green - System is operating normally.
		Blinking Amber — BIOS/ROMmon is booting.
		Steady Amber — BIOS/ROMmon has completed booting, and the system is at the ROMmon prompt or booting the platform software.

Port	LED color	Description
VPN	Green	Off— No tunnel.
		Steady Green— At least one tunnel is up.
Activity (WAN and LAN ports)	Green	Off— No data transmission.
		Blinking Green - TXD/RXD data.
Link, non-PoE (WAN and LAN ports)	Green	Off— No link.
		Steady Green— Link up.
Link, with PoE (WAN and LAN ports, C8161-G2 only)	Green	Off— No link, PoE administratively down.
		Steady Green— link up; if PoE device, power is enabled.
Power over Ethernet (PoE/PoE+)	Green	Off — No -53.5V PoE power supply connected to router.
		Steady Green— -53.5V PoE power supply connected and all powered ports operating normally.
Blue beacon	Blue	Off — No attention needed.
		Blinking Blue— Beacon active.

Reset button

The actuation of the Reset button is only recognized during ROMmon boot, that is, as the router comes to the ROMmon prompt.

The Reset button does not require much force to be pressed. The Reset button should be pressed only with a small implement such as the tip of a pen or a paper clip. When the Reset button is pressed at startup, the system LED turns green.

Slots and interfaces

The Cisco 8100 Series Secure Routers designates its interfaces using a 3-tuple notation that lists the slot, sub-slot, and port in the format slot/sub-slot/port. The slot number is reserved for the motherboard, which is "0". Each interface type is allocated a sub-slot and the port number is a unique port on the interface.

Table 5: Slots and Interfaces

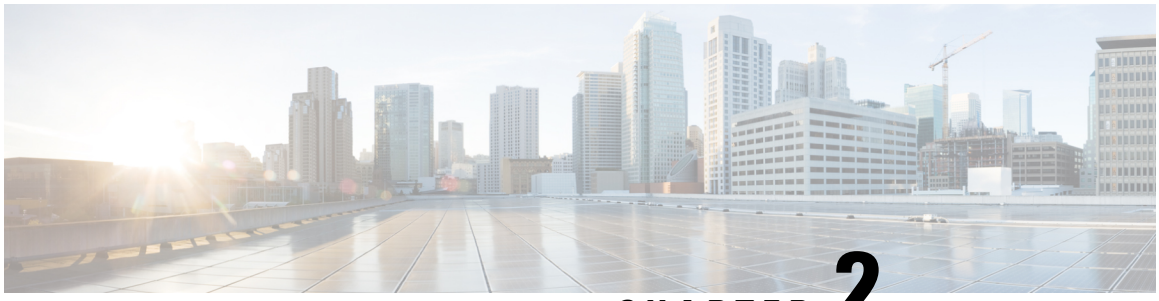
Sub-slot 0/x/x	Interface type
0	Ethernet WAN

Sub-slot 0/x/x	Interface type
1	Ethernet LAN
2	Cellular

Periodic inspection and cleaning

We recommend that you periodically inspect and clean the external surface of the router. Removing is recommended to minimize the negative impact of environmental dust or debris. The frequency of inspection and cleaning is dependent upon the severity of the environmental conditions, but we recommend cleaning the router once every six months.

Note Sites with ambient temperatures consistently above 25°C or 77°F and with potentially high levels of dust or debris might require periodic preventative maintenance cleaning.



CHAPTER 2

Prepare for Router installation

Before you install the Cisco 8100 Series Secure Routers, you must prepare your site for the installation. This chapter provides the preinstallation steps, such as recommendations and requirements that should be considered before installing your router.

- Ensure that the power and cabling requirements are in place at your installation site.
- Ensure that the equipment required to install the router is available.
- Ensure that your installation site meets the environmental conditions to maintain normal operation.

Before installing the router, you must consider power and cabling requirements that must be in place at your installation site, special equipment for installing the router, and the environmental conditions your installation site must meet to maintain normal operation.

The shipping package for the router is engineered to reduce the chances of product damage associated with routine material handling experienced during shipment:

- Router should always be transported or stored in its shipping package in the upright position.
- Keep the router in the shipping container until you have determined the installation site.

Note Inspect all items for shipping damage. If an item appears damaged, contact a Cisco customer service representative immediately.

Safety recommendations

Before you install, configure, or perform maintenance on the router, review the documentation for the procedure you are about to perform, paying special attention to the safety warnings. The following guidelines will help to ensure your own safety and protect your Cisco equipment.

- Cisco safety policy mandates that all its routers must conform to the requirements of IEC 62368-1 with appropriate national deviations, as a minimum. In addition, Cisco routers must also meet the requirements of any other normative documents, for example, standards, technical specifications, laws or regulations.
- Never attempt to lift an object that might be too heavy for you to lift by yourself.
- Always unplug the power cable before installing or removing a chassis.
- Keep the chassis area clear and dust free during and after installation.
- Keep tools and chassis components away from walk areas.
- Do not wear loose clothing, jewelry (including rings and chains), or other items that could get caught in the chassis. Fasten your tie or scarf and sleeves.
- The router operates safely when it is used in accordance with its marked electrical ratings and product-usage instructions.

Note Do not unpack the system until you are ready to install it. Keep the chassis in the shipping container to prevent accidental damage until you determine an installation site. Use the appropriate unpacking documentation included with the system.

Warning **Statement 1071—**Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Read the installation instructions before using, installing, or connecting the system to the power source. Use the statement number at the beginning of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS

Read the installation instructions in this document before you connect the system to its power source. Failure to read and follow these guidelines could lead to an unsuccessful installation and possibly damage the system and components.

Prevent electrostatic discharge damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. It can occur if electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the router chassis is electrically connected to ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
- If no wrist strap is available, ground yourself by touching a metal part of the chassis

Caution For the safety of your equipment, periodically check the resistance value of the anti-static strap. It should be between 1 and 10 megohms (Mohm).

General site requirements

This section describes the requirements your site must meet for the safe installation and operation of your router. Ensure that the site is properly prepared before beginning installation. If you are experiencing shutdowns or unusually high errors with your existing equipment, the guidelines provided in this section can also help you isolate the cause of failures and prevent future problems. Take note of the following general safety warnings:

Note **Statement 407**—Japanese Safety Instruction

You are strongly advised to read the safety instruction before using the product.

https://www.cisco.com/web/JP/techdoc/pldoc/pldoc.html

When installing the product, use the provided or designated connection cables/power cables/AC adapters.

〈製品使用における安全上の注意〉

www.cisco.com/web/JP/techdoc/index.html

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Warning **Statement 445—**Connect the Chassis to Earth Ground

To reduce the risk of electric shock, connect the chassis of this equipment to permanent earth ground during normal use.

Warning **Statement 1005—**Circuit Breaker

This product relies on the building's installation for short-circuit (overcurrent) protection. To reduce risk of electric shock or fire, ensure that the protective device is rated not greater than:

Warning **Statement 1015—**Battery Handling

To reduce risk of fire, explosion, or leakage of flammable liquid or gas:

- Replace the battery only with the same or equivalent type recommended by the manufacturer.
- Do not dismantle, crush, puncture, use a sharp tool to remove, short the external contacts, or dispose of the battery in fire.
- Do not use if battery is warped or swollen.
- Do not store or use battery in a temperature > .
- Do not store or use battery in low air pressure environment < .

Warning **Statement 1022—**Disconnect Device

To reduce the risk of electric shock and fire, a readily accessible disconnect device must be incorporated in the fixed wiring.

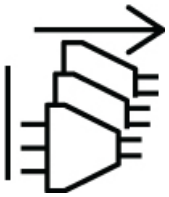
Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning

Statement 1028—More Than One Power Supply

This unit might have more than one power supply connection. To reduce risk of electric shock, remove all connections to de-energize the unit.



Warning

Statement 1029—Blank Faceplates and Cover Panels

Blank faceplates and cover panels serve three important functions: they reduce the risk of electric shock and fire, they contain electromagnetic interference (EMI) that might disrupt other equipment, and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.

Warning

Statement 1032—Lifting the Chassis

To prevent personal injury or damage to the chassis, never attempt to lift or tilt the chassis using the handles on modules, such as power supplies, fans, or cards. These types of handles are not designed to support the weight of the unit.

Warning

Statement 1046—Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning

Statement 1055—Class 1/1M Laser

Invisible laser radiation is present. Do not expose to users of telescopic optics. This applies to Class 1/1M laser products.

Warning **Statement 1071—**Warning Definition

IMPORTANT SAFETY INSTRUCTIONS

Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Read the installation instructions before using, installing, or connecting the system to the power source. Use the statement number at the beginning of each warning statement to locate its translation in the translated safety warnings for this device.

SAVE THESE INSTRUCTIONS

Warning **Statement 1073—**No User-Serviceable Parts

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning **Statement 1074—**Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Warning **Statement 1098—**Lifting Requirement

people are required to lift the heavy parts of the product. To prevent injury, keep your back straight and lift with your legs, not your back.

Warning **Statement 9001—**Product Disposal

Ultimate disposal of this product should be handled according to all national laws and regulations.

Site selection guidelines

The Cisco 8100 Series Secure Routers require specific environmental operating conditions. Temperature, humidity, altitude, and vibration can affect the performance and reliability of the router. The following sections provide specific information to help you plan for the proper operating environment.

The Cisco 8100 Series Secure Routers are designed to meet the industry EMC, safety, and environmental standards described in the Regulatory Compliance and Safety Information for the Cisco 8100 Series Secure Routers document.

Rack requirements

For the Cisco 8100 Series Secure Routers, use brackets with a 19-inch rack.

The following information can help you plan your equipment rack configuration:

- Allow clearance around the rack for maintenance.
- Allow at least one rack unit of vertical space between routers; more clearance is required when stacking multiple Cisco 8100 Series Secure Routers. Provide adequate heat removal mechanism to keep the surrounding air temperature well within the specified operating temperature condition.
- Ensure that the rack is level and stable before extending a component from the rack.
- Ensure that proper airflow is provided to the components in the rack.

Note More spacing may be required depending on the installation environment.

- Enclosed racks must have adequate ventilation. Ensure that the rack is not congested because each router generates heat. An enclosed rack should have louvered sides and a fan to provide cooling air. The heat generated by the equipment near the bottom of the rack can be drawn upward into the intake ports of the equipment above it.
- When mounting a chassis in an open rack, ensure that the rack frame does not block the intake or exhaust ports. If the chassis is installed on slides, check the position of the chassis when it is seated in the rack.

Safety with electricity

Follow these basic guidelines when you are working with any electrical equipment:

- Before beginning any procedures requiring access to the chassis interior, locate the emergency power-off switch for the room in which you are working.
- Disconnect all power and external cables before installing or removing a chassis.
- Do not work alone when potentially hazardous conditions exist.
- Never assume that power has been disconnected from a circuit; always check.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe. Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards such as moist floors, ungrounded power extension cables, and missing safety grounds.

Power guidelines and requirements

Check the power at your site to ensure that you are receiving power that is free of spikes and noise. Install a power conditioner, if necessary.

Refer to the Power supply section that lists the power requirements for the Cisco 8100 Series Secure Routers.

Network cabling specifications

The following sections describe the cables, and the specifications required to install Cisco 8100 Series Secure Routers:

Console port considerations

The router includes a RJ45 console port.. The console ports provide access to the router using a console terminal connected to the console port. This section discusses important cabling information to consider before connecting the router to a console terminal or modem.

Console terminals send data at speeds slower than modems do; therefore, the console port is ideally suited for use with console terminals.

EIA/TIA-232

Depending on the cable and the adapter used, this port appears as a DTE or DCE device at the end of the cable. Only one port can be used at the same time. The default parameters for the console port are 9600 baud, 8 data bits, 1 stop bit, and no parity.

The console port does not support hardware flow control. For detailed information about installing a console terminal, see the Connecting to a Console Terminal or Modem section.

For cable and port pinouts, see the Cisco Modular Access Router Cable Specifications document located on Cisco.com.

Ethernet connections

The IEEE has established Ethernet as standard IEEE 802.3. The routers support the following Ethernet implementations:

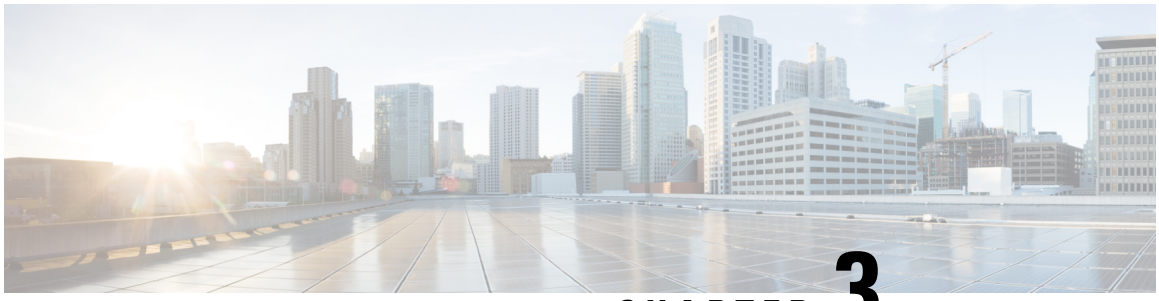
1000BASE-T—1000 Mb/s full duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable.	Supports the Ethernet maximum length of 328 feet (100 meters).
100BASE-T—100 Mb/s full duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable.	Supports the Ethernet maximum length of 328 feet (100 meters).
10BASE-T—10 Mb/s full duplex transmission over a Category 5 or better unshielded twisted-pair (UTP) cable.	Supports the Ethernet maximum length of 328 feet (100 meters).

See the Cisco Modular Access Router Cable Specifications document at Cisco.com for information about Ethernet cables, connectors, and pinouts.

Required tools and equipment for installation and maintenance

You need the following tools and equipment to install and upgrade the router and its components:

- An ESD-preventive cord and a wrist strap.
- A number 2 Phillips screwdriver.
- Phillips screwdrivers: small, 3/16-in. (4 to 5 mm) and medium 1/4-in. (6 to 7 mm). You might need these when you install or remove modules.
- Screws that fit the rack.
- A wire crimper.
- A wire for connecting the chassis to an earth ground: AWG 14 (2 mm^2) or larger wire.
- An appropriate user-supplied UL or a CSA-certified ring terminal with an inner diameter of 1/4 in. (5 to 7 mm).



CHAPTER 3

Install and connect the Router

This chapter describes how to install and connect Cisco 8100 Series Secure Routers to LAN and WAN networks.

Unpack the router

Unpack the router only when you are ready to install it. If the installation site is not ready, to prevent accidental damage, keep the chassis in its shipping container until you are ready to install. The router, accessory kit, publications, and any optional equipment you order may be shipped in more than one container. When you unpack the containers, check the packing list to ensure that you have received all the listed items.

Items shipped with your router

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco 8100 Series Secure Routers.

The following items are shipped with your router:

- Getting Started/Product Document of Compliance
- Grounding Lug Kit
- Power Supply
- AC Power Cord

Install the router

After unpacking, based on your requirements, you can set up the Cisco 8100 Series Secure Router under-desk, on a desktop, a rack, or the wall.

Note You can install external modules before or after mounting a router. However, if you choose to install the external modules after mounting the router on the rack or wall, ensure that you have optimal access to the back/front panel of the router.

Note To prevent the system from overheating, do not operate the device in an area that exceeds a local ambient of 40°C. For altitudes above sea-level, de-rate the ambient operating temperature by 1°C per 1000-feet of elevation.

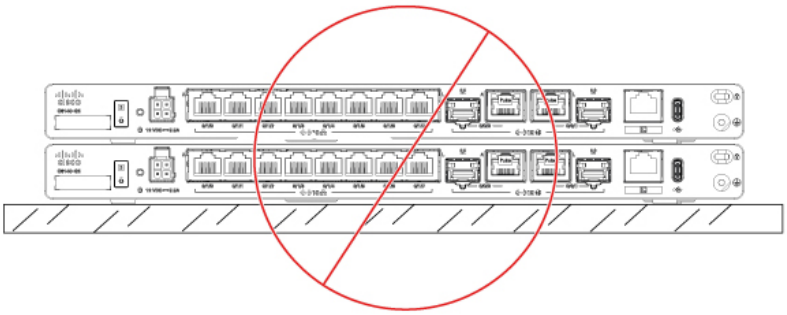
Note When mounting a Cisco 8100 Series Secure Router, the local ambient should be measured 2-inches below the fully mounted product when possible. When this is not possible the local ambient should be measured 2-inches from the I/O side of the product.

Module	Mounting Options
C8130-G2	Desktop, Rack mount, Under Desk/Shelf Mount, Wall mount using Key-hole slots, Wall mount DIN-rail brackets
C8140-G2	
C8151-G2	
C8161-G2	

Desktop

If you choose to setup the router on a desktop, you can place the router on a desktop, bench top, or shelf.

Caution Do not place anything on top of the device and do not stack devices on a desktop, else, this causes the product to overheat.



Rack mount

Secure rack mounting brackets on the chassis before you set up the chassis on the rack.

Caution

Do not stack multiple Cisco 8100 Series Secure Routers when mounting the routers on a tabletop.

Do not put any object on the sides or on top of the routers ensuring that there is ample space for air circulation and heat removal. Your chassis installation must allow unrestricted airflow for chassis cooling.

Important

Periodic Inspection and Cleaning:

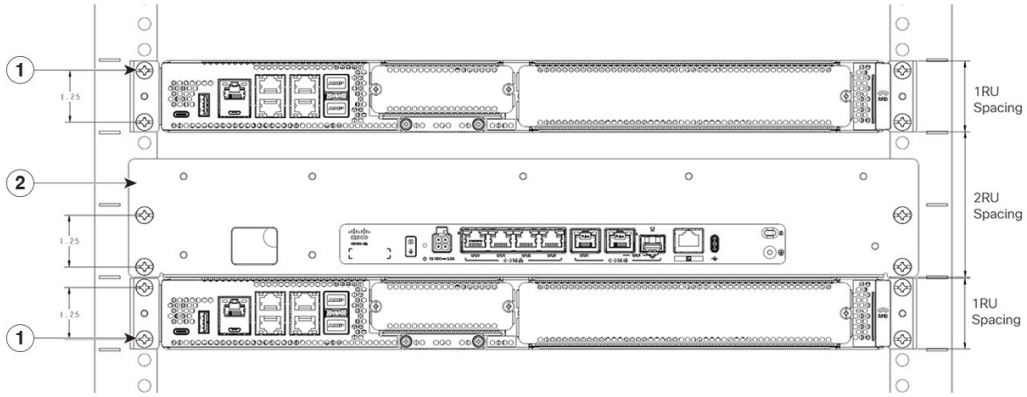
We recommend that you periodically inspect and clean the external surface of the router. Removing is recommended to minimize the negative impact of environmental dust, debris, and liquid contamination. The frequency of inspection and cleaning is dependent upon the severity of the environmental conditions, but we recommend cleaning the router once every six months.

Note

Sites with ambient temperatures consistently above 25°C or 77°F and with potentially high levels of dust or debris might require periodic preventative maintenance cleaning.

Note When mounting Cisco 8100 Series Secure Routers on a rack, ensure at least one rack unit (1RU) of vertical space between routers. This ensures more heat removal, which in turn helps the surrounding air temperature to stay within the specified operating conditions.

Figure 11: Rack-tray assembly



1	Typical 1RU Product (reference only)
2	Rack-tray installed

Attach the rack mount brackets

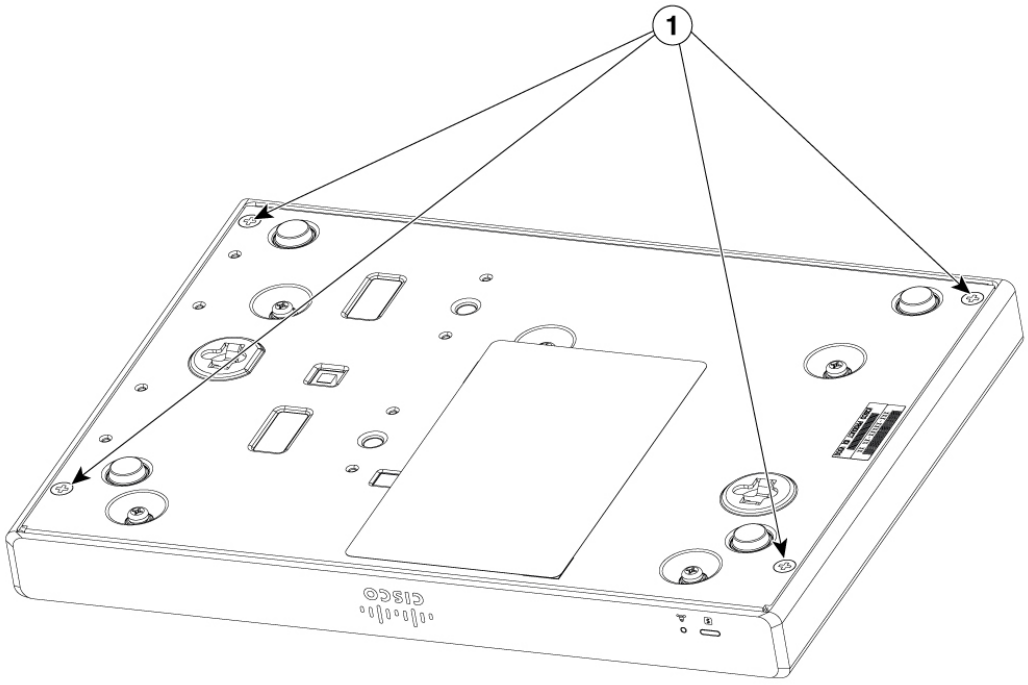
This procedure describes how to attach the brackets on the router chassis for C8130-G2, C8140-G2, C8151-G2 and C8161-G2:

Procedure

Step 1 Remove the screws from the bottom of the chassis as per shown in the following figures.

Example:

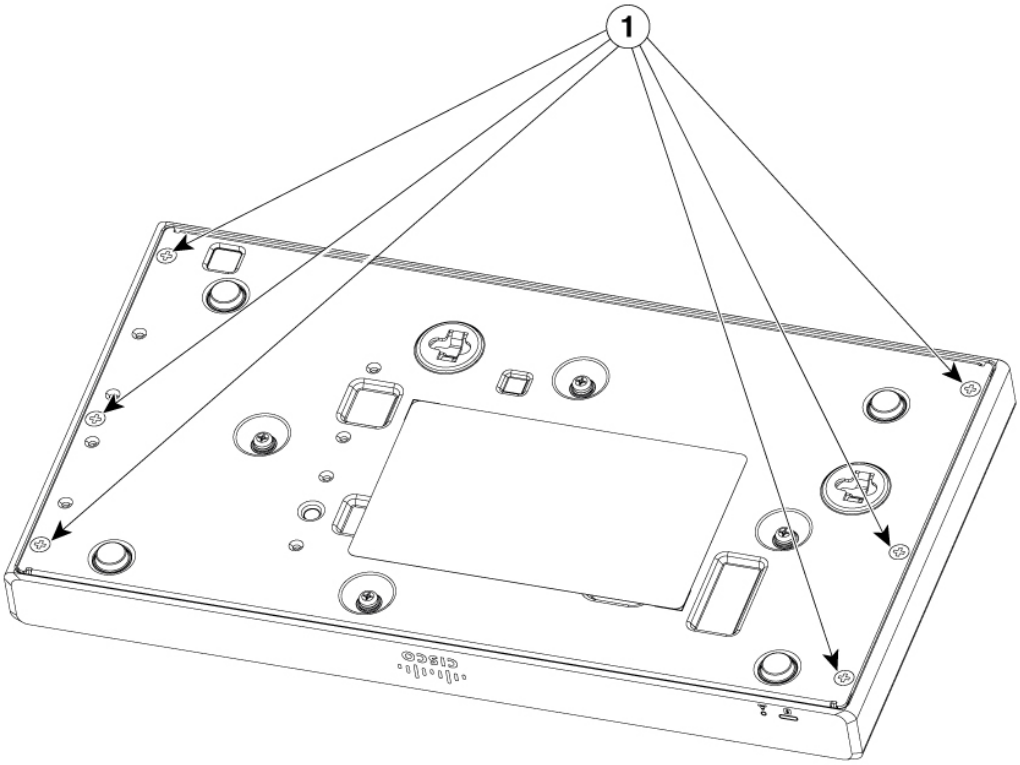
Figure 12: Removing screws from C8130-G2



1	Screws

Example:

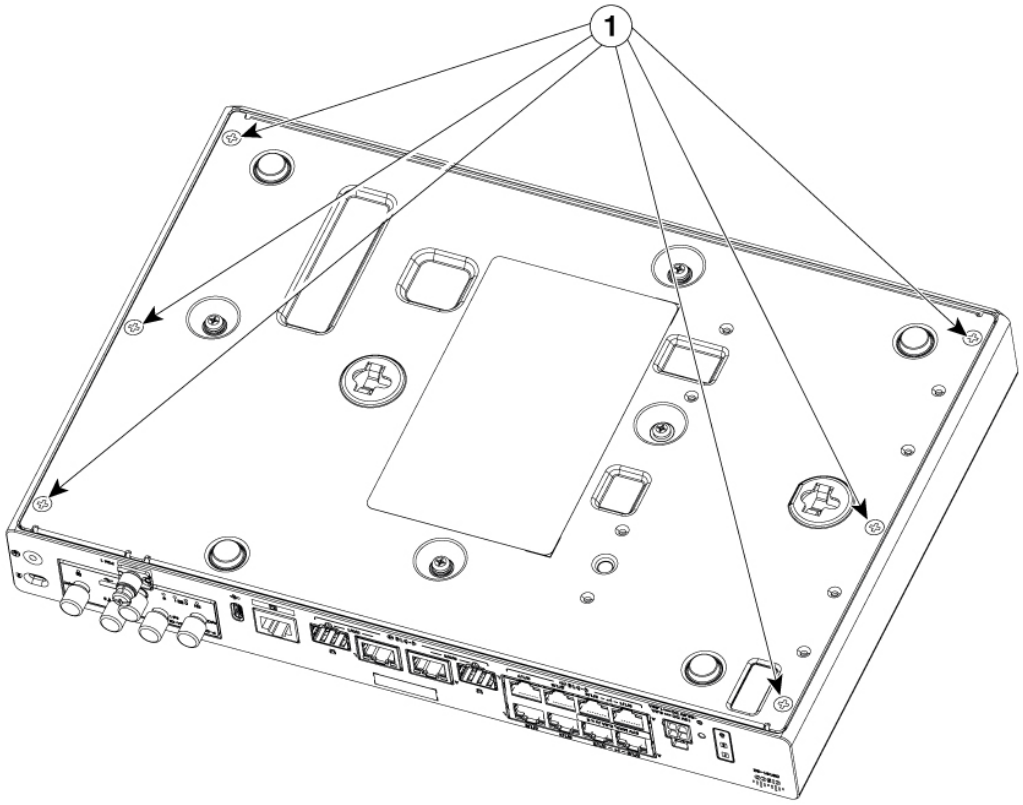
Figure 13: Removing screws from C8140-G2



1	Screws

Example:

Figure 14: Removing screws from C8151-G2 and C8161-G2



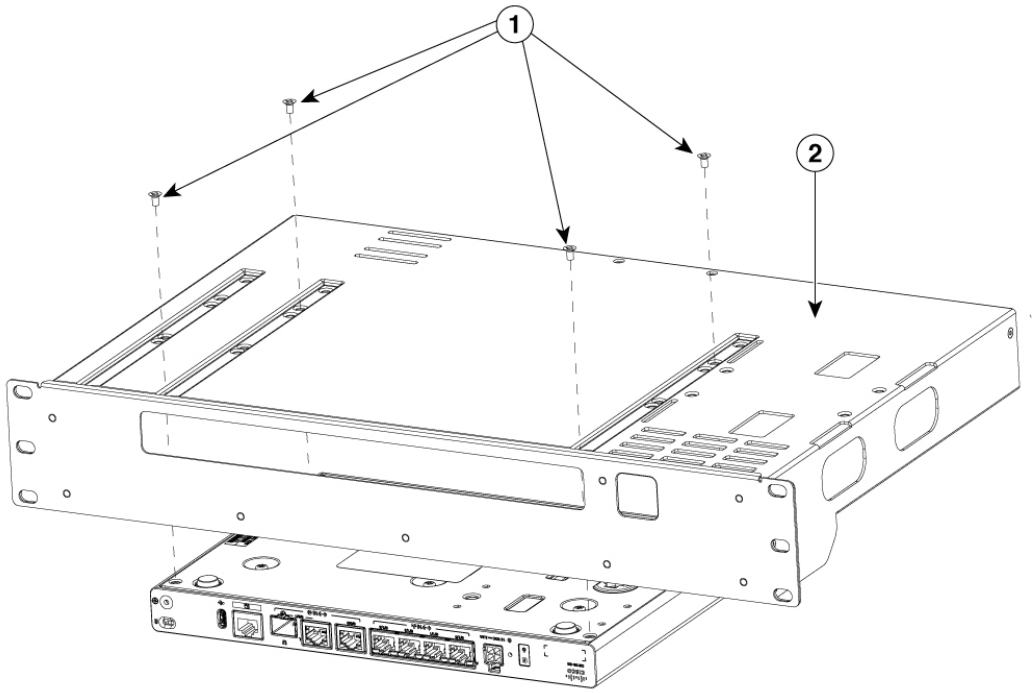
1	Screws

Step 2 Align the bracket to the indicated holes of the chassis.

Step 3 Secure the bracket to the router using the screws that were removed.

Example:

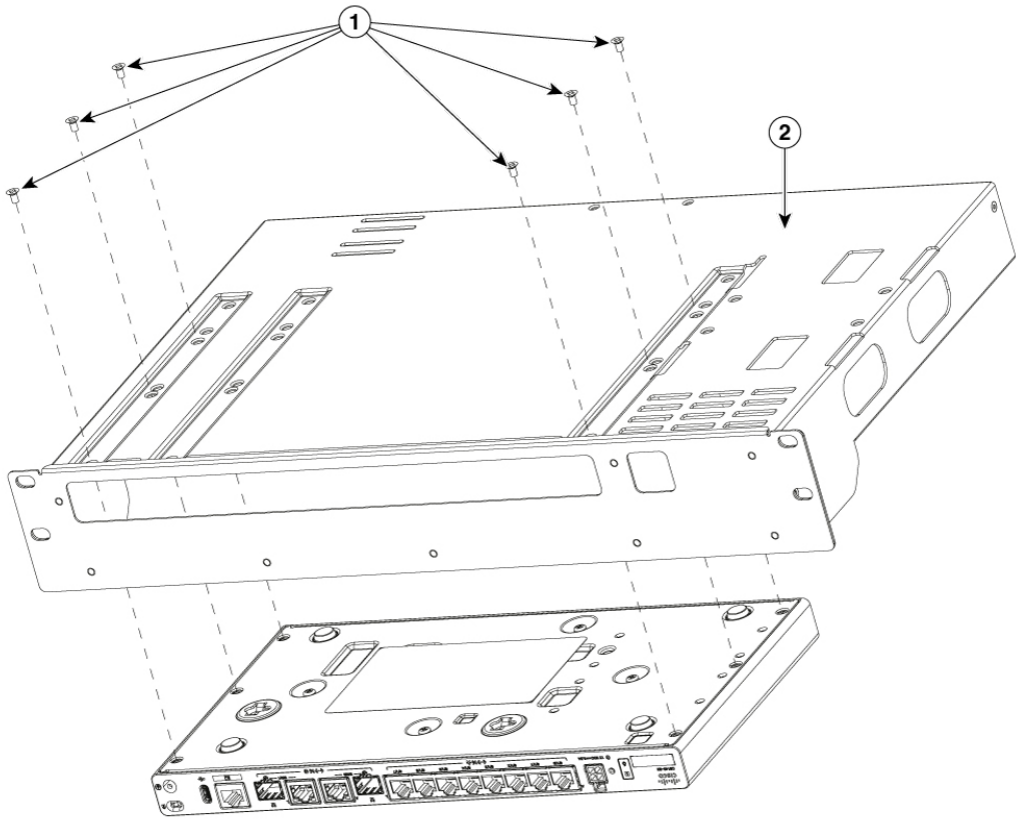
Figure 15: Rack mounting bracket installation for C8130-G2



1	Screws
2	Brackets

Example:

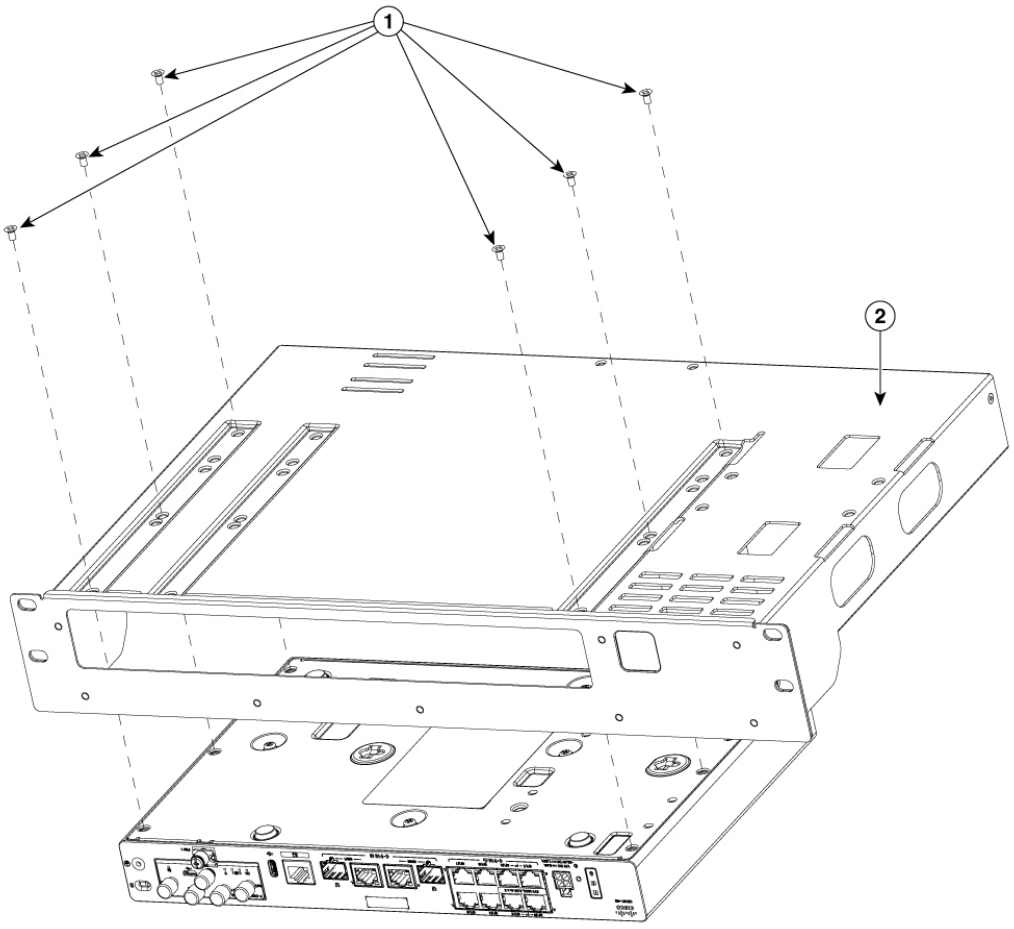
Figure 16: Rack mounting bracket installation for C8140-G2



1	Screws
2	Brackets

Example:

Figure 17: Rack mounting bracket installation for C8151-G2 and C8161-G2



1	Screws
2	Brackets

Mount the router

Before you begin

Before mounting the router on to the rack, refer to the following safety warning statements:

Warning **Statement 1006—**Chassis Warning for Rack-Mounting and Servicing

To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Procedure

To install the router, use the screws provided with the accessory kit to secure the router when you mount it over the rack.

Under desk or shelf mount

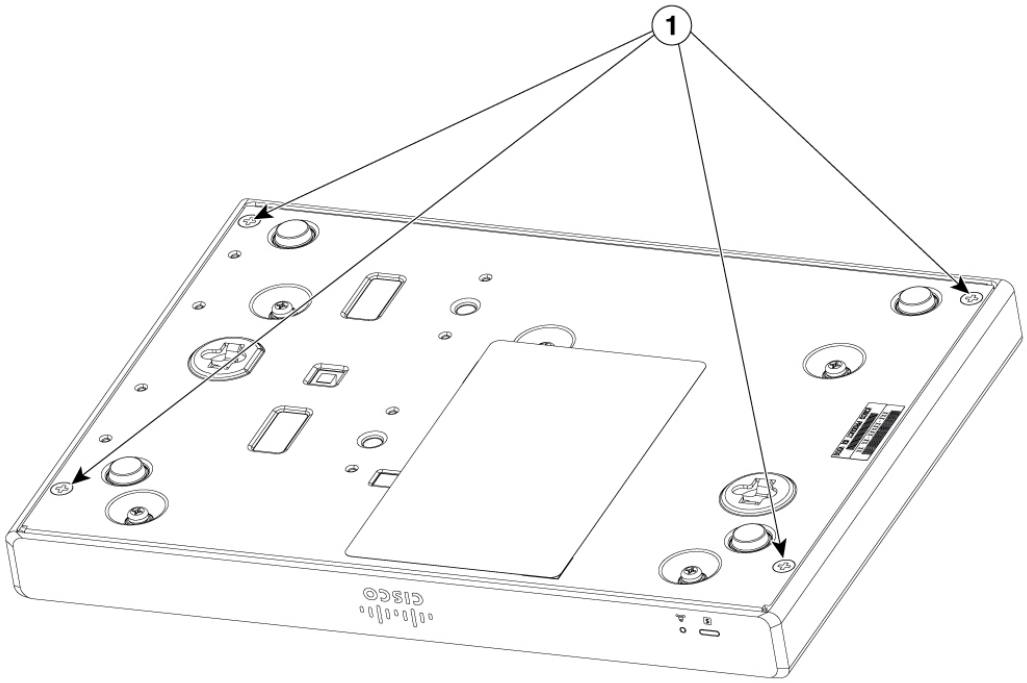
Installing the router under a desk requires an optional bracket kit that is not included with the router. The kit contains the under-desk brackets and screws to secure the brackets to the bottom of the desk. You can order these kits from your Cisco representative. This procedure describes how to mount a router under a desk or a shelf.

Procedure

Step 1 Remove the screws from the bottom of the chassis.

Example:

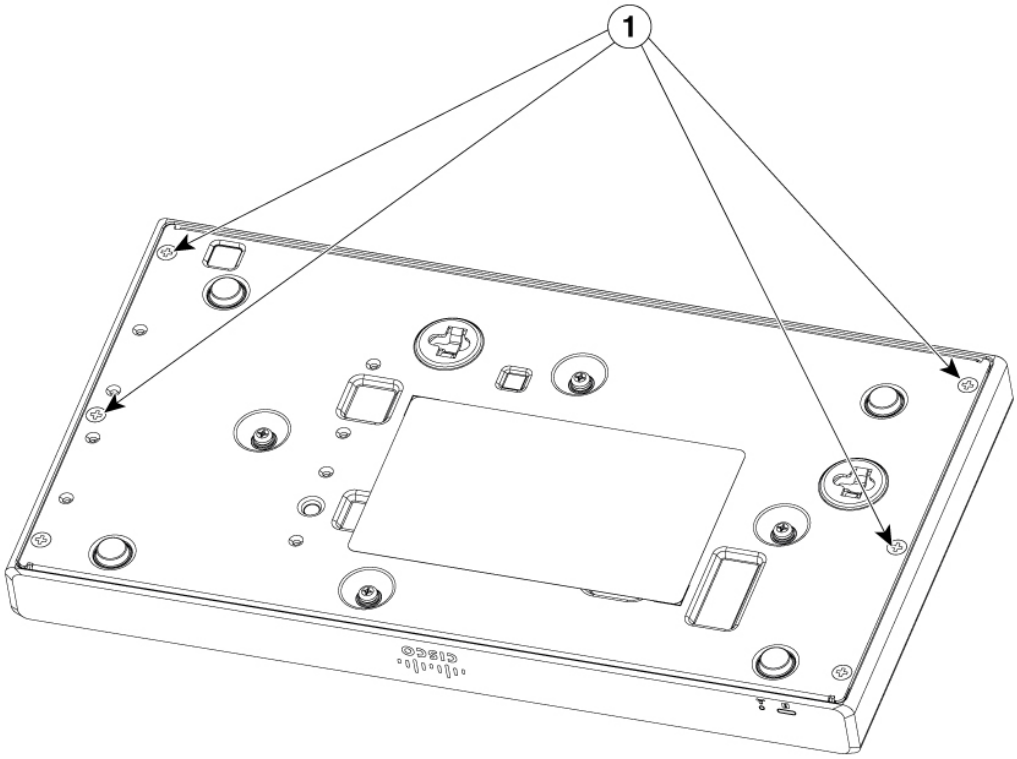
Figure 18: Removing screws from C8130-G2



1	Screws

Example:

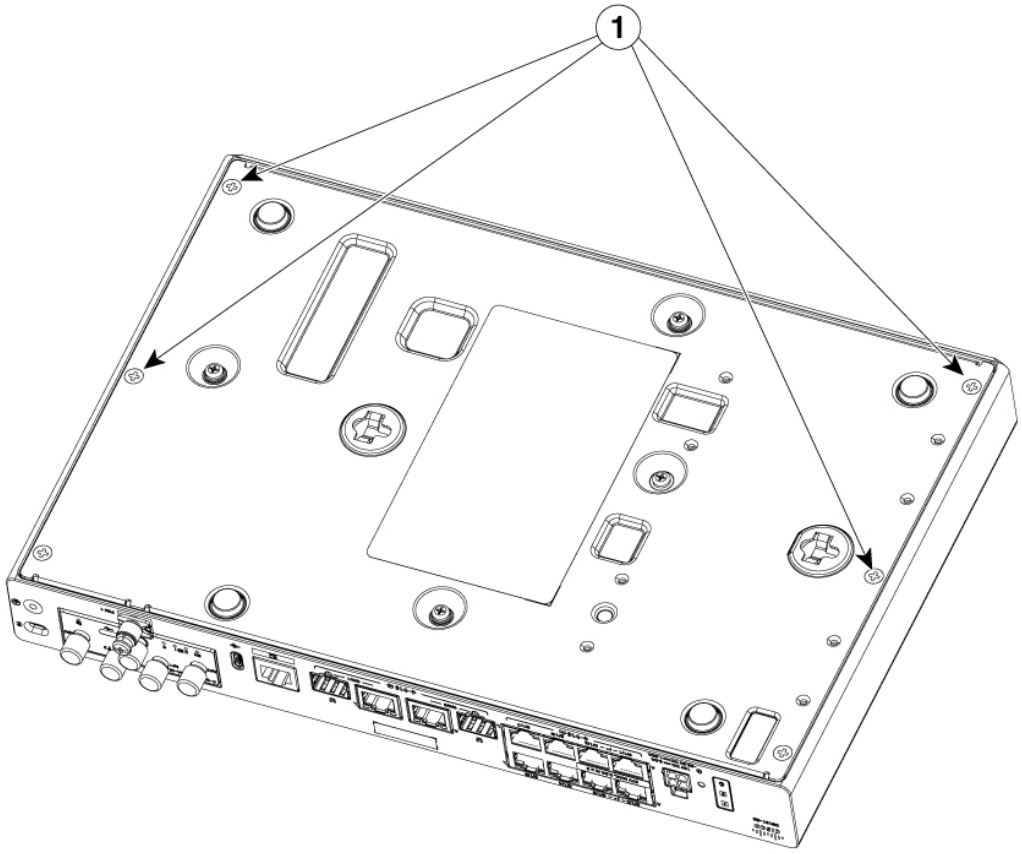
Figure 19: Removing screws from C8140-G2



1	Screws

Example:

Figure 20: Removing screws from C8151-G2 and C8161-G2

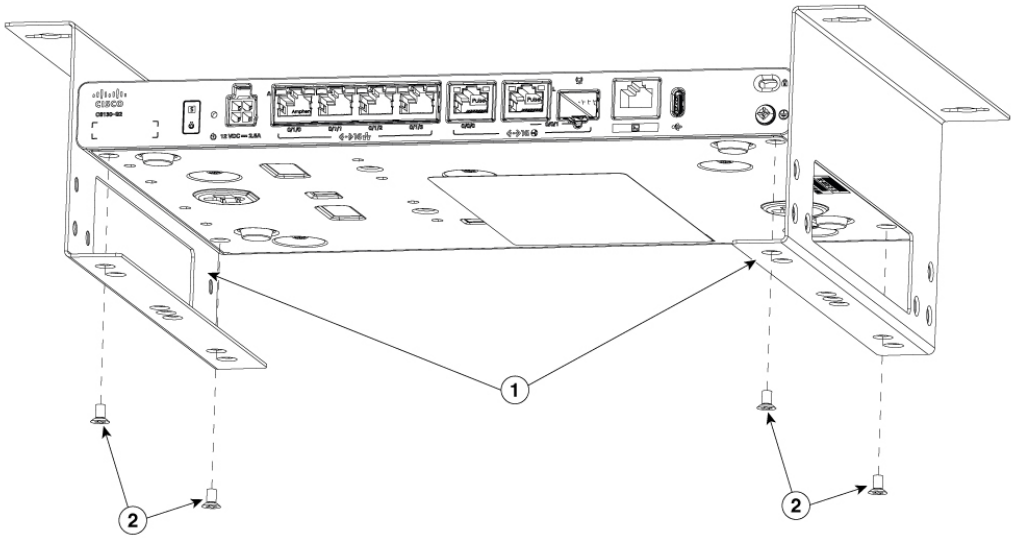


1	Screws

Step 2 Align the brackets to the indicated screw holes of the chassis.

Example:

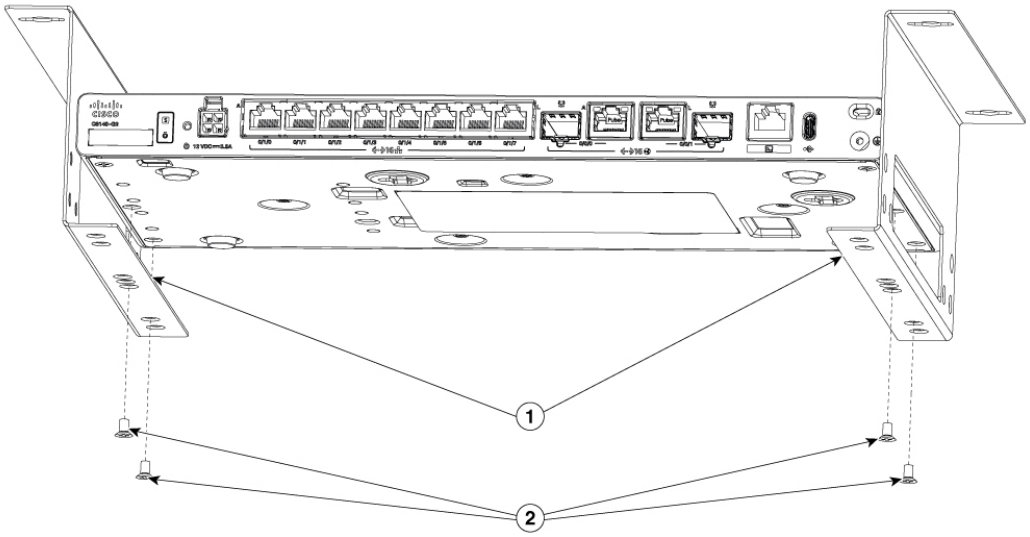
Figure 21: Under desk mounting brackets installation for C8130-G2



1	Under desk mounting brackets
2	Screws

Example:

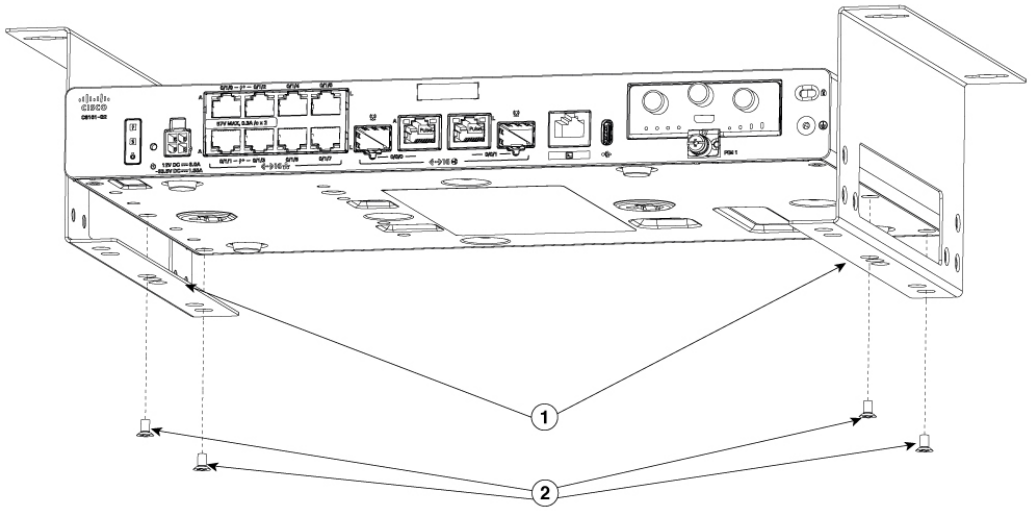
Figure 22: Under desk mounting brackets installation for C8140-G2



1	Under desk mounting brackets
2	Screws

Example:

Figure 23: Under desk mounting brackets installation for C8151-G2 and C8161-G2

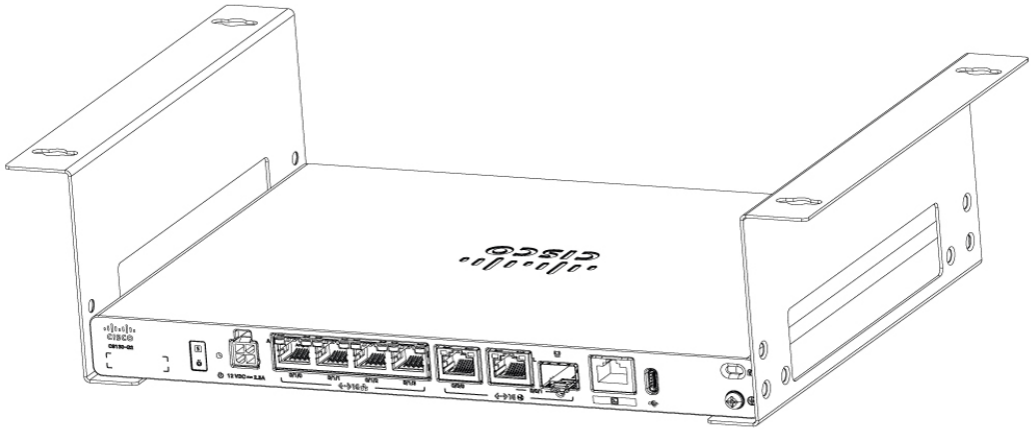


1	Under desk mounting brackets
2	Screws

Step 3 Secure the under desk mounting brackets to the router using the screws. Ensure that all the screw fasteners on the installed components are securely tightened.

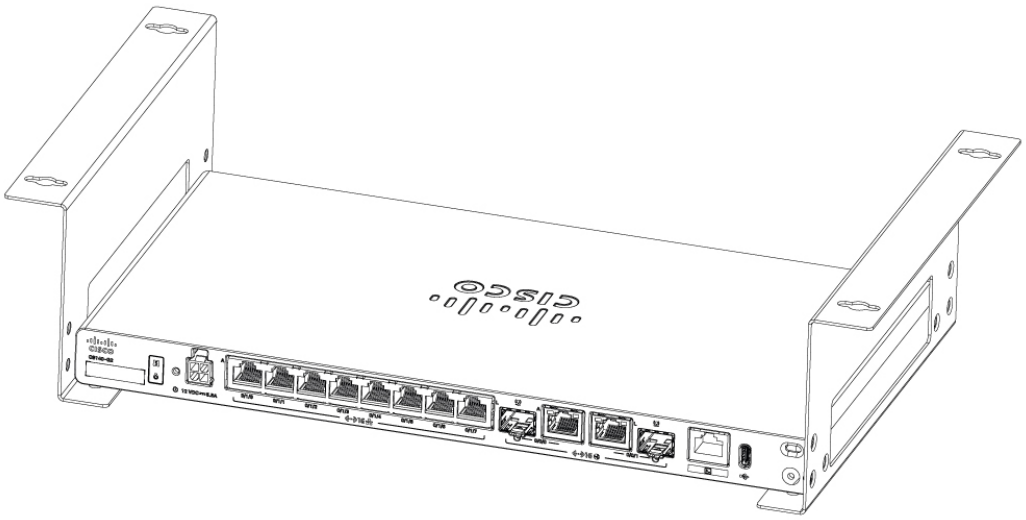
Example:

Figure 24: C8130-G2 with attached under desk mounting brackets



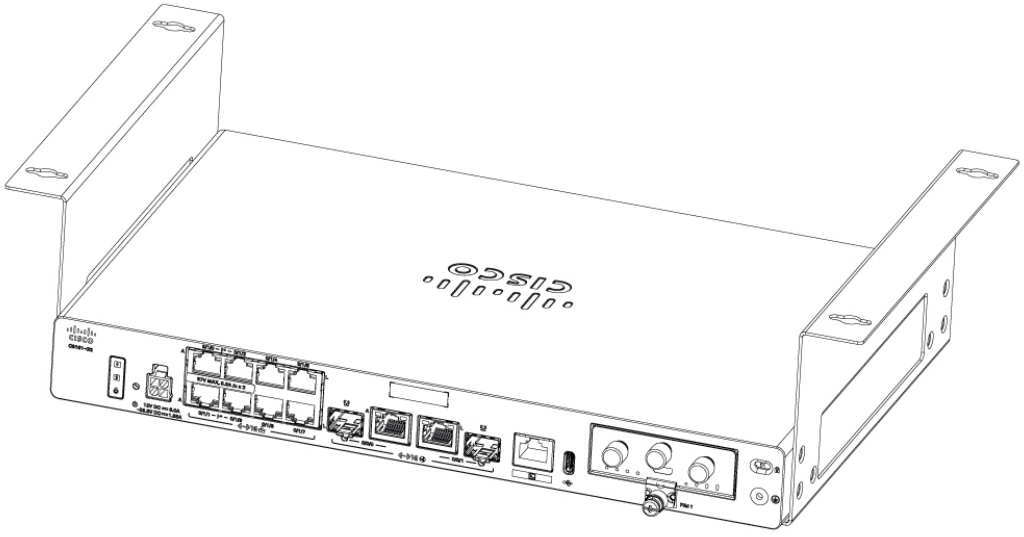
Example:

Figure 25: C8140-G2 with attached under desk mounting brackets



Example:

Figure 26: C8151-G2 and C8161-G2 with attached under desk mounting brackets



Step 4 After the bracket is attached, drill a 2mm hole under the desk and insert the wooden screws. Mount the router under the desk or shelf using the pan-head wood screws.

Example:

Figure 27: Mounting C8130-G2 under a shelf

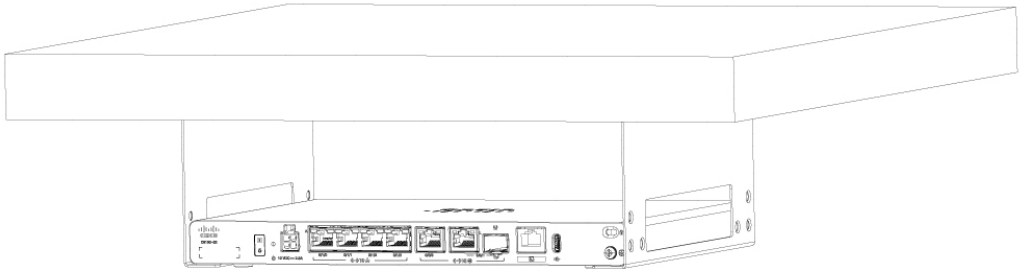


Figure 28: Mounting C8140-G2 under a shelf

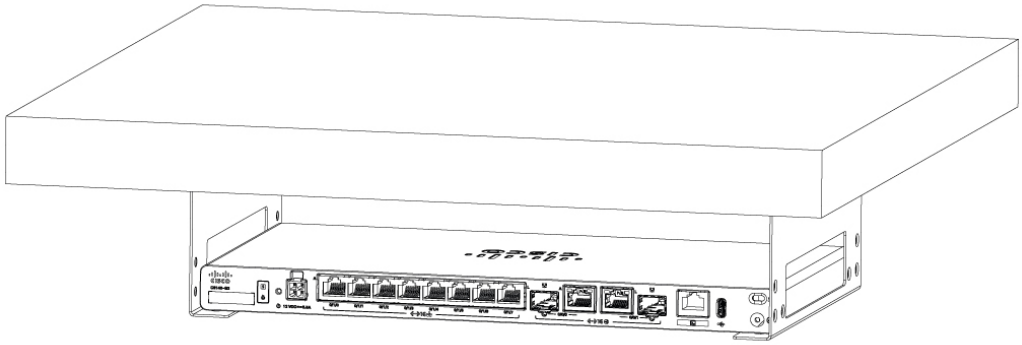


Figure 29: Mounting C8151-G2 and C8161-G2 under a shelf

Figure 30: Pan-head wood screws

Wall mount

There are two ways to mount a router on the wall, using **Keyhole slots** and **DIN rail brackets**.

Warning **Statement 1094—**Read Wall-Mounting Instructions Before Installation

Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.

Note The recommended clearance when a router is horizontally mounted is 1.5 inches on both sides for clearance and 1.75 inches on top. I/O side clearance is needed as it is required to access the cable connections. Clearance is not required on the backside (opposite side from I/O face) unless mounting on a DIN rail. Clearance is required to attach and mount the DIN rail bracket.

Wall mount using Keyhole Slots

The Cisco 8100 Series Secure Routers have keyhole slots at the bottom of the chassis for mounting on a wall or any vertical surface.

Note When choosing a location for wall mounting the router, consider cable limitations and wall structure.

Note Route the cables so that they do not put a strain on the connectors or mounting hardware.

Procedure

Step 1 Measure the distance between both the keyhole slots and mark them onto the wall.

Step 2 Drill holes into the wall as per the markings you took in **Step 1**, and insert the screws in it.

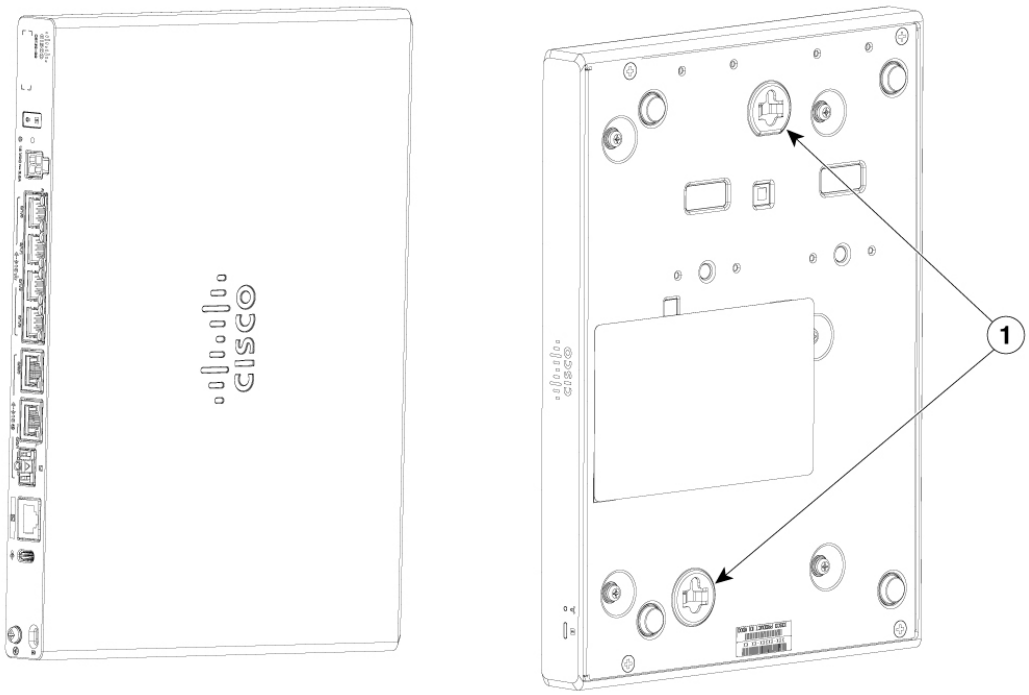
To attach a router to the wall stud, each bracket should have one number 10 wood screw (pan-head) with number 10 washers, or two number 10 washer-head screws. The screws must be long enough to penetrate at least 1.5 inches (38.1 mm) into the supporting wood or metal wall stud.

For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size number 6 (pan-head).

Step 3 Place the router onto the screws and slide the router to lock it into place.

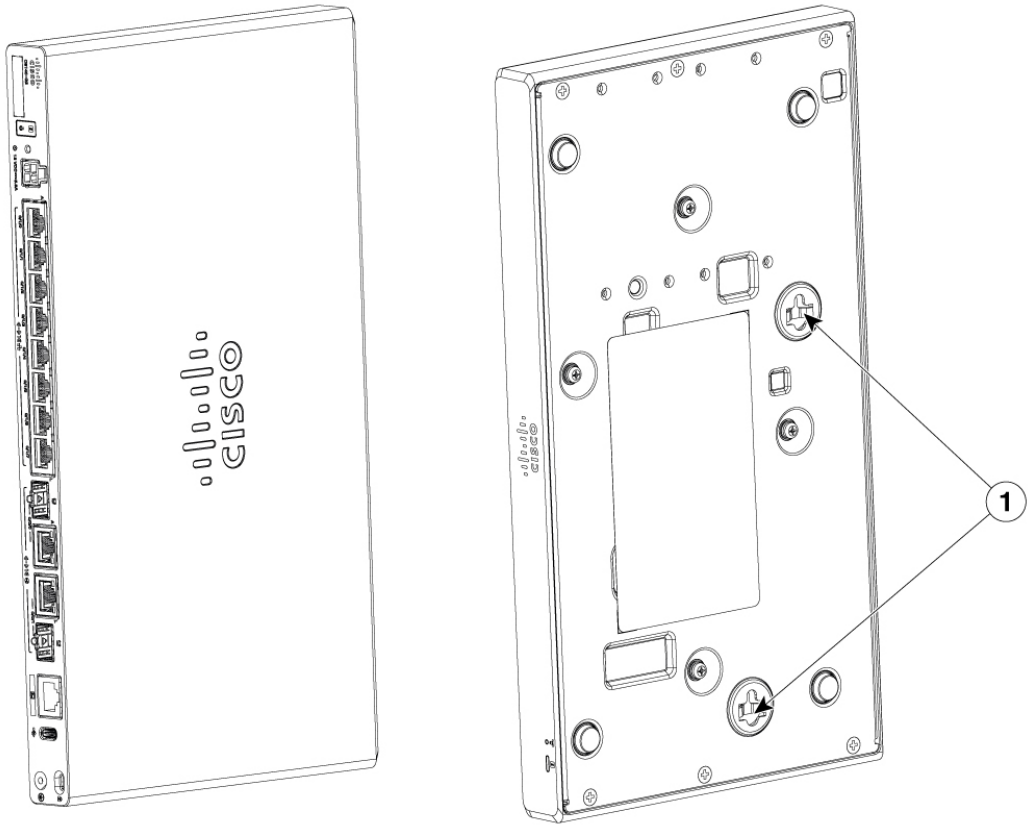
Example:

Figure 31: Wall mount using keyhole slots for C8130-G2



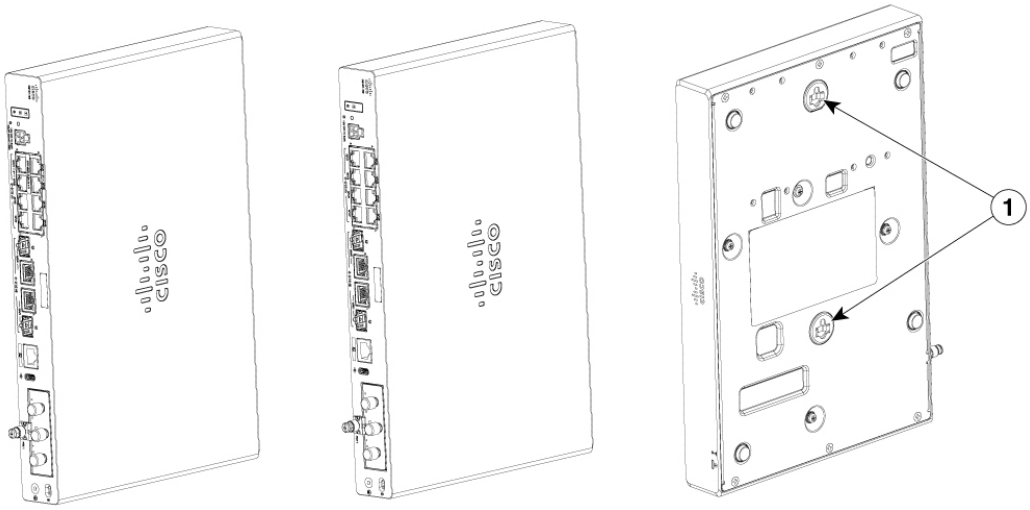
1	Keyhole slots Horizontal spacing: 1.693 in(43.00 mm) Vertical spacing: 8.113 in(206.07 mm)

Figure 32: Wall mount using keyhole slots for C8140-G2



1	Keyhole slots Horizontal spacing: 1.330 in(33.78 mm) Vertical spacing: 6.500 in(165.10 mm)

Figure 33: Wall mount using keyhole slots for C8151-G2 and C8161-G2



1	Keyhole slots Key-hole slots spacing: 7.250 in(184.15 mm)

Wall mount using DIN rail brackets

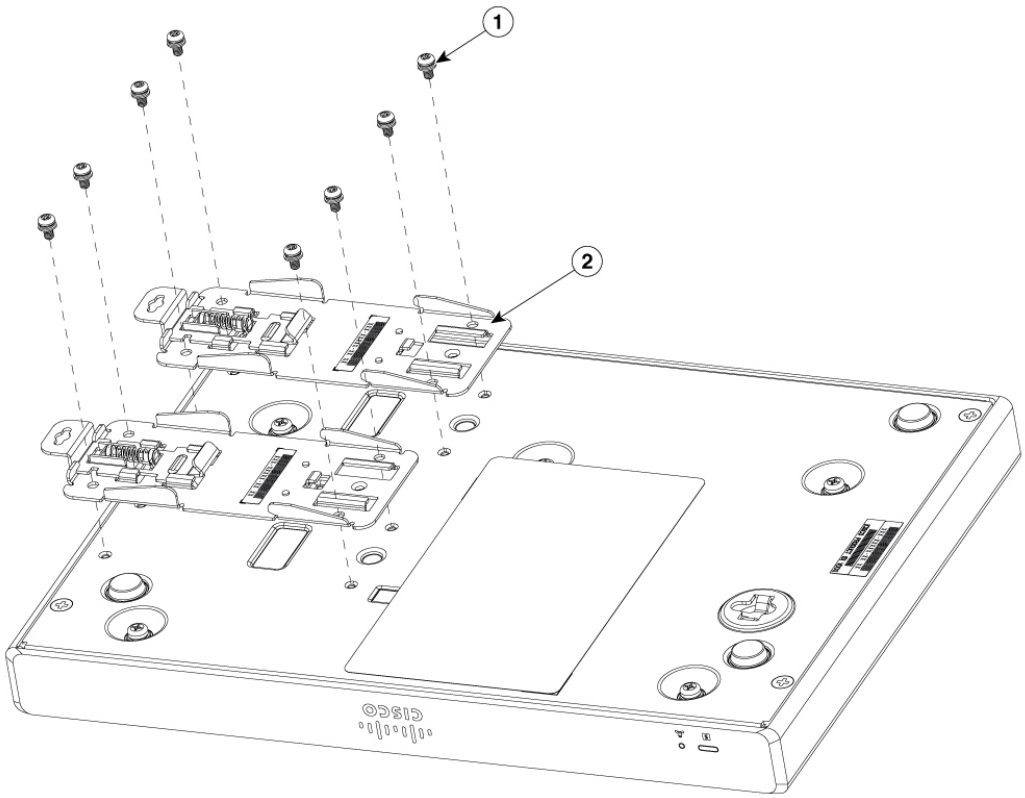
The router is shipped with DIN rail brackets that are to be secured on the bottom side of the chassis. Your chassis installation must allow unrestricted airflow for chassis cooling.

Procedure

Step 1 Align the din rail brackets to the holes indicated in the following figure.To attach the DIN rail brackets to the router chassis, use the PHMS screws and the plastic spacers provided for each bracket.

Example:

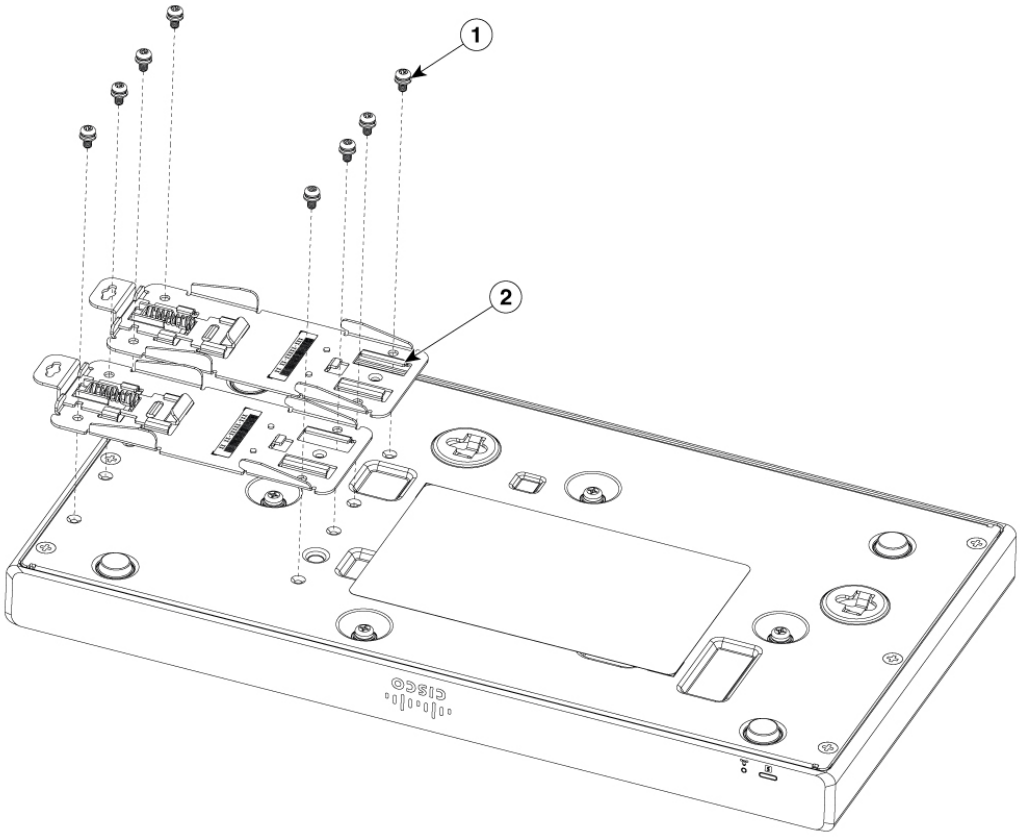
Figure 34: DIN rail bracket installation for C8130-G2



1	PHMS screws
2	DIN rail brackets

Example:

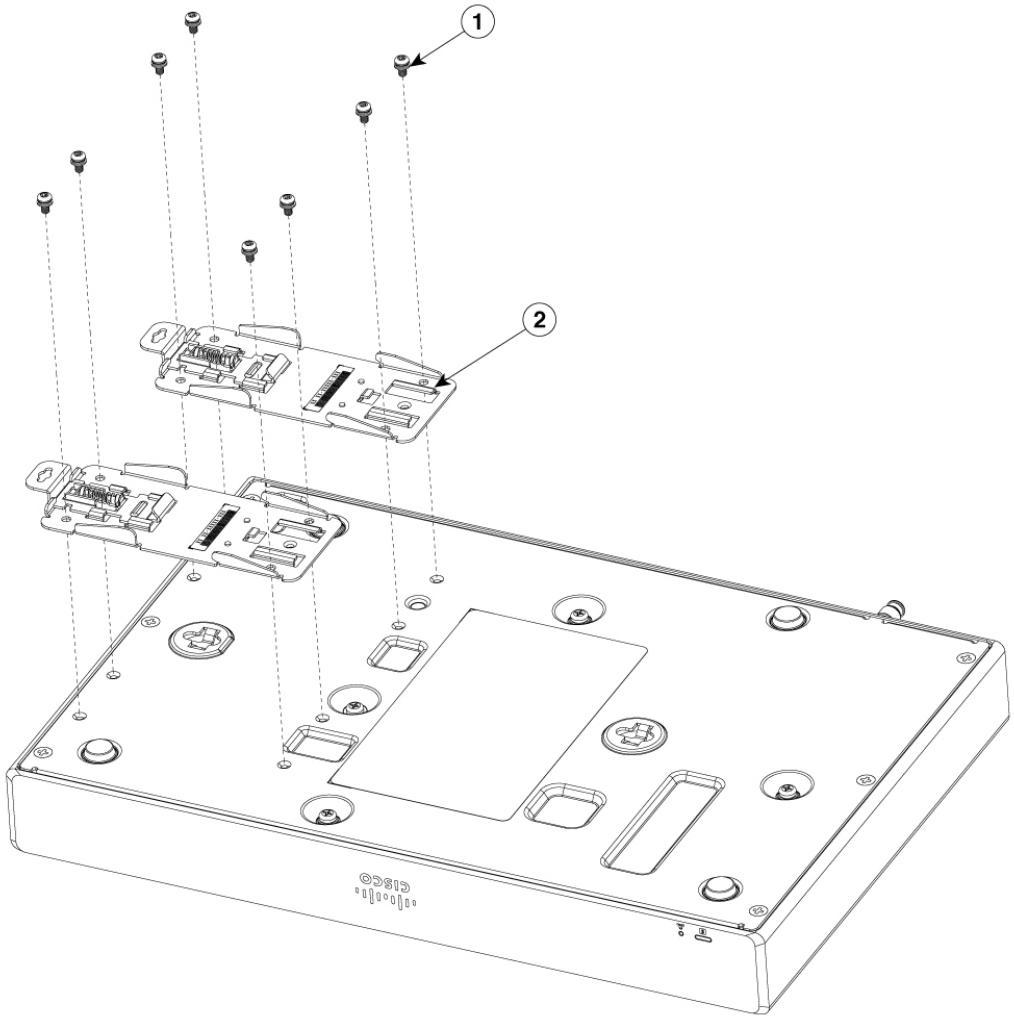
Figure 35: DIN rail bracket installation for C8140-G2



1	PHMS screws
2	DIN rail brackets

Example:

Figure 36: DIN rail bracket installation for C8151-G2 and C8161-G2



1	PHMS screws
2	DIN rail brackets

Step 2 Secure the din rail brackets to the router using the PHMS screws and the plastic spacers provided for each bracket.

Example:

Figure 37: C8130-G2 with attached DIN rail brackets

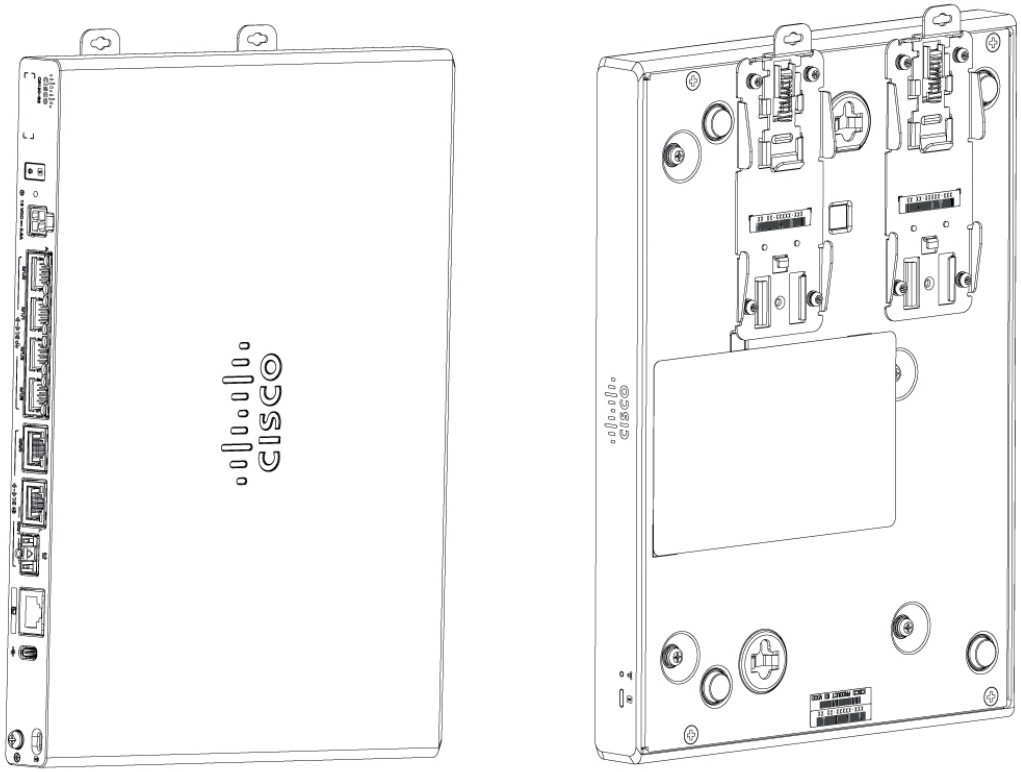


Figure 38: C8140-G2 with attached DIN rail brackets

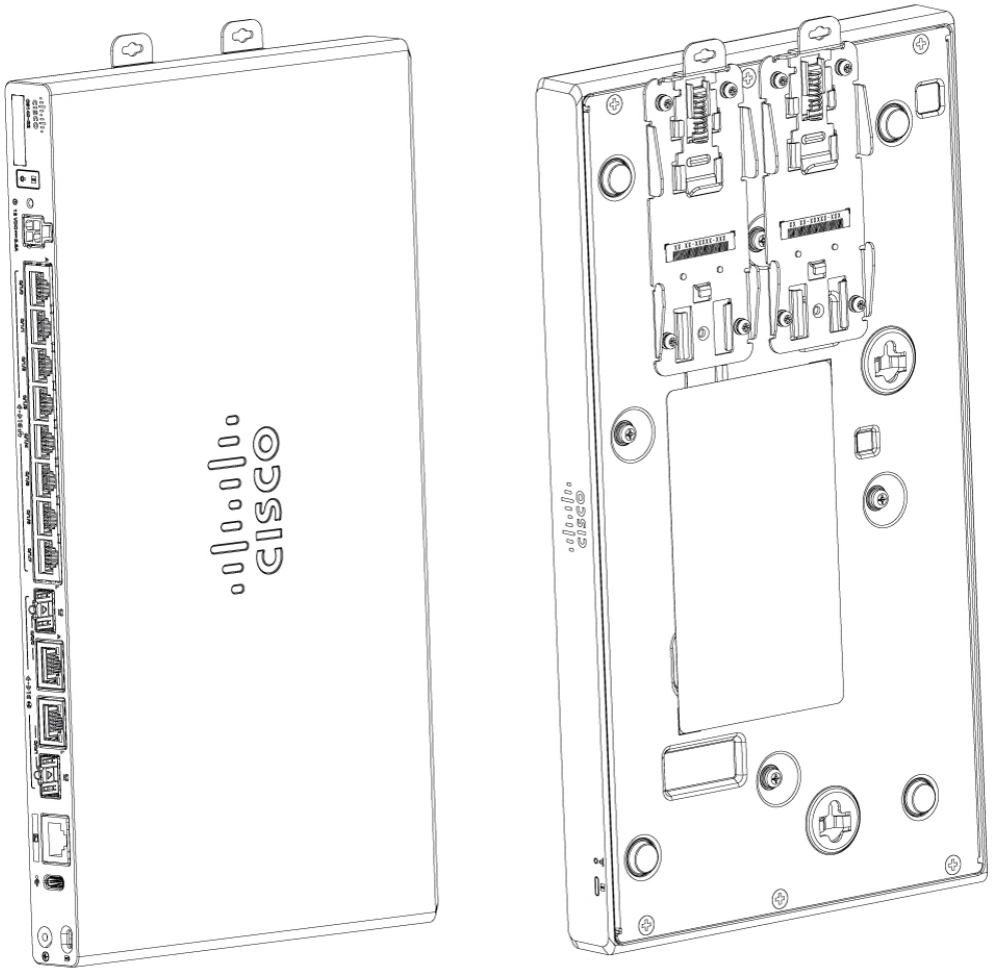
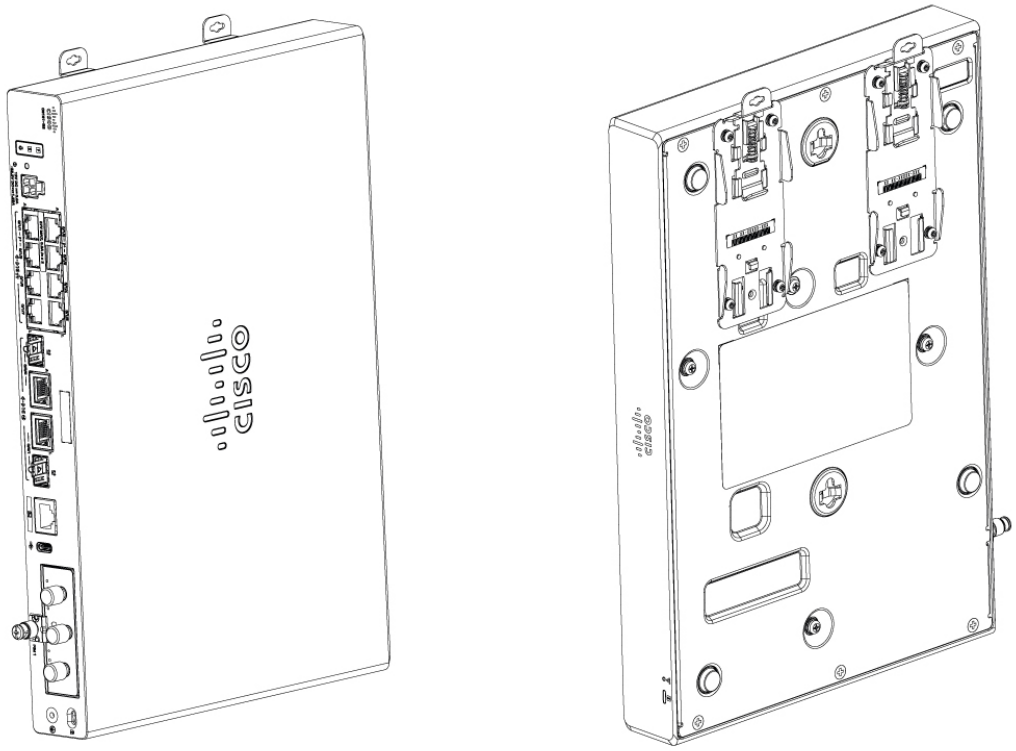


Figure 39: C8151-G2 and C8161-G2 with attached DIN rail brackets



Note
Do not over-torque the screws. The recommended torque is 8 to 10 inch-lbf (0.9 to 1.1 N-m).

Step 3 Attach the brackets onto the DIN rail to clamp it together.

Example:

Figure 40: Mounting C8130-G2 using DIN rail brackets

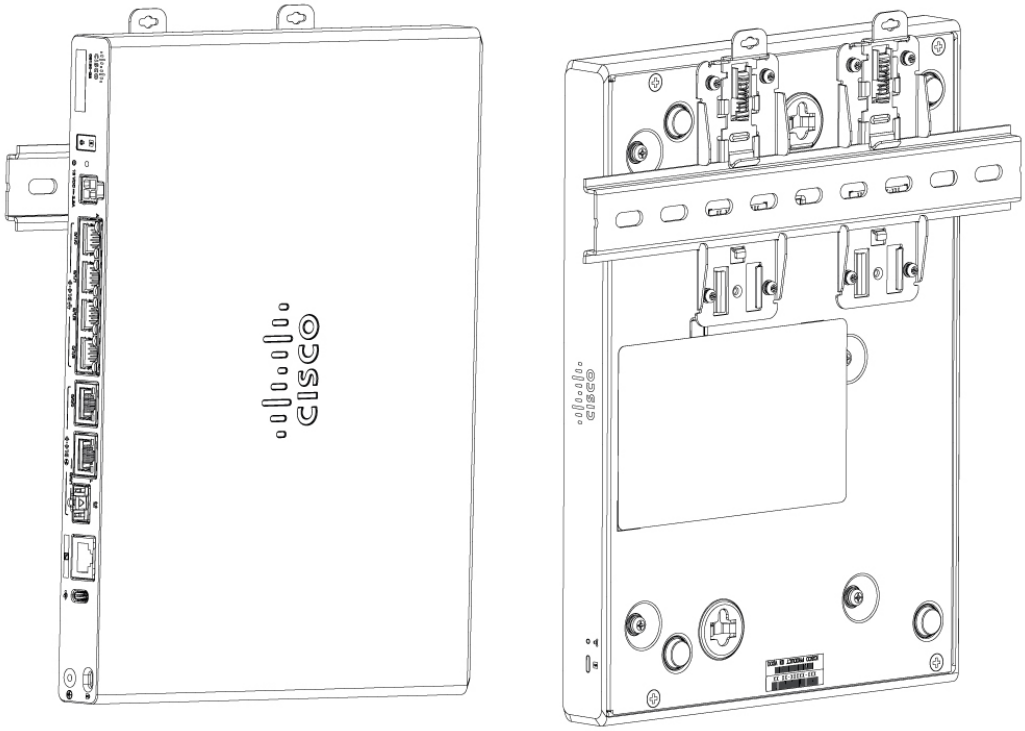


Figure 41: Mounting C8140-G2 using DIN rail brackets

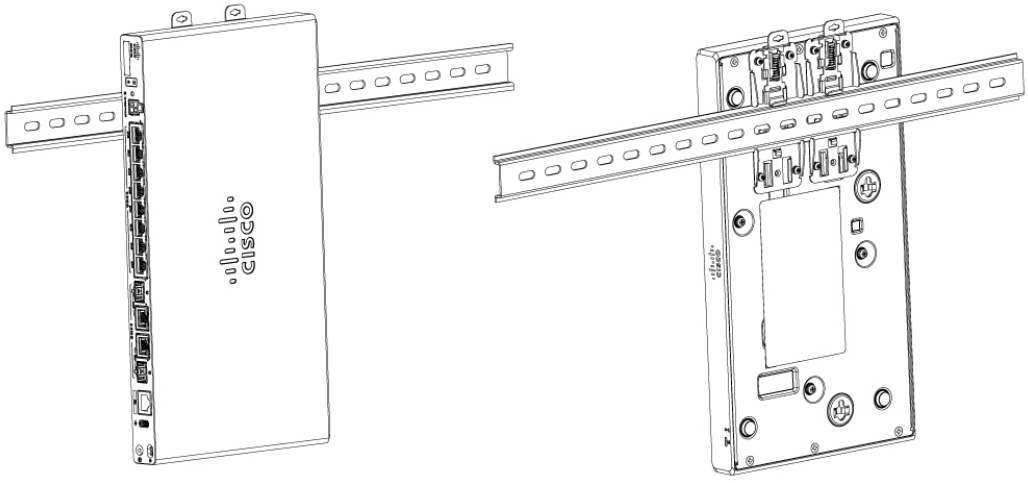
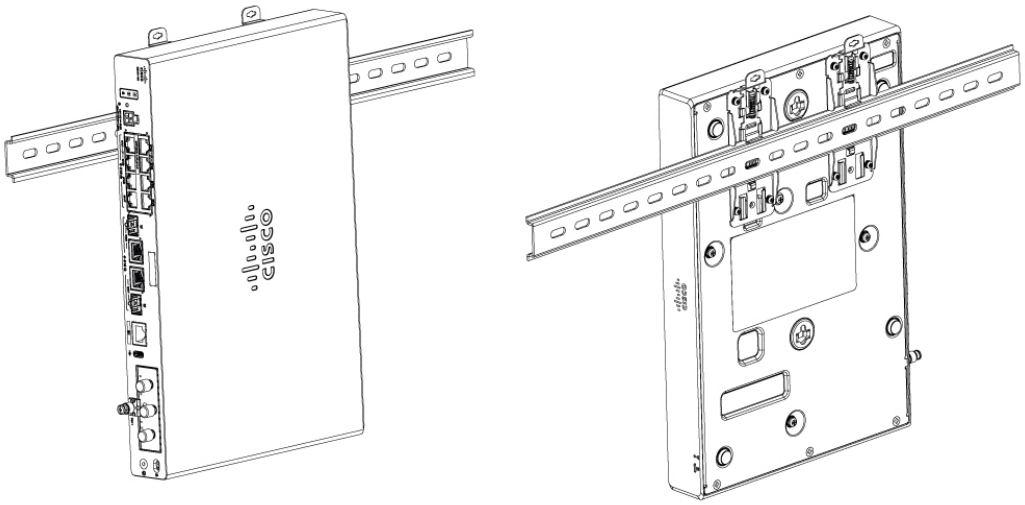


Figure 42: Mounting C8151-G2 and C8161-G2 using DIN rail brackets



Ground connection warnings

Take note of the following ground connection warnings:

Warning **Statement 1101—**Connected To Grounded Outlet

In the Scandinavian countries (Denmark, Finland, Iceland, Norway, and Sweden) the appliance must be connected to a grounded outlet.

Chassis grounding

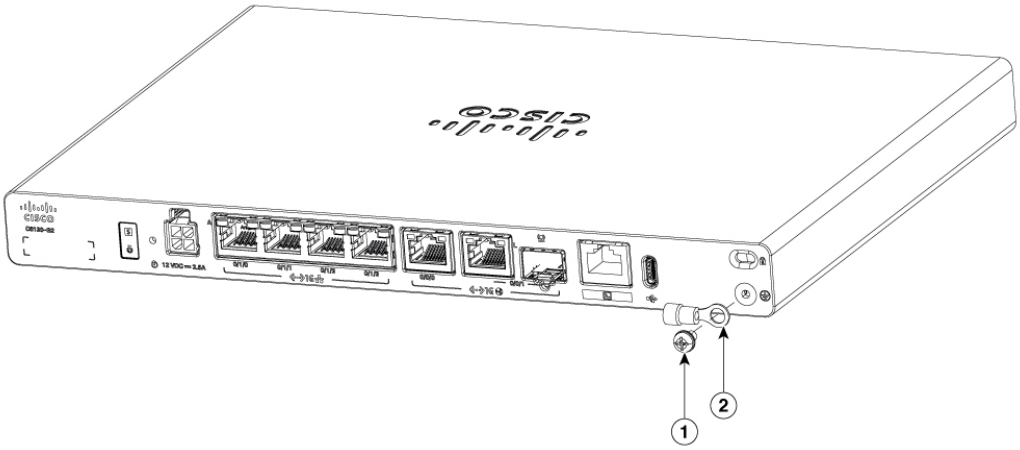
After you set up the router, connect the chassis to a reliable earth ground. The ground wire must be installed in accordance with local electrical safety standards. For grounding the chassis, use a copper wire of size of 14 AWG (2 mm²). Following components are provided along with the router:

1. Ground Lug
2. UNC 5-32 screws which have a length of about 0.25 inches.

To install the ground connection for your router, perform the following steps:

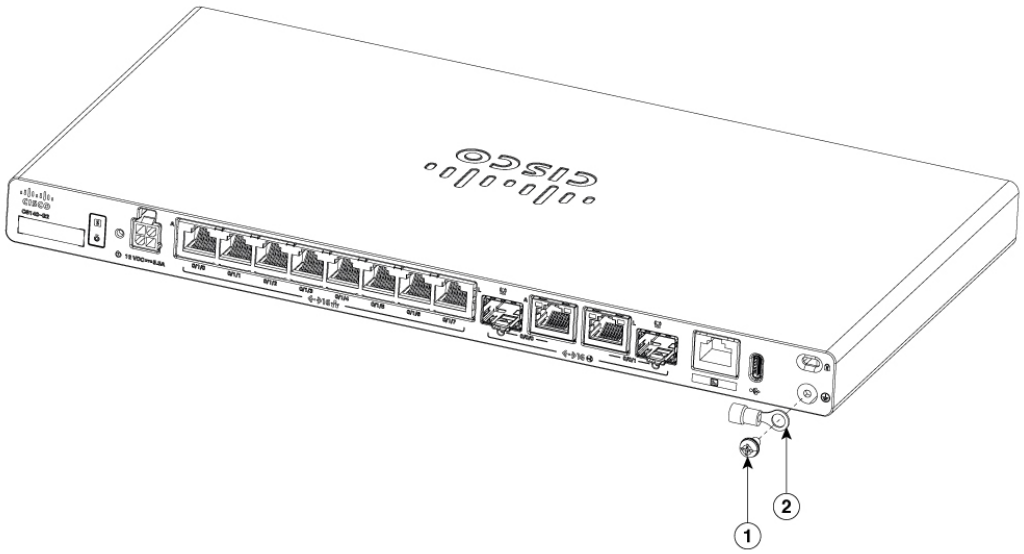
1. Strip one end of the ground wire to the length approximately 0.75 inch (20 mm) for the ground lug.
2. Crimp the ground wire to the ground lug using a crimp tool of the appropriate size.
3. Attach the ground lug to the chassis as shown in the below figures. Tighten the screw; the recommended torque is 8 to 10 inch-lbf (0.9 to 1.1 N-m).

Figure 43: Chassis ground connection - C8130-G2



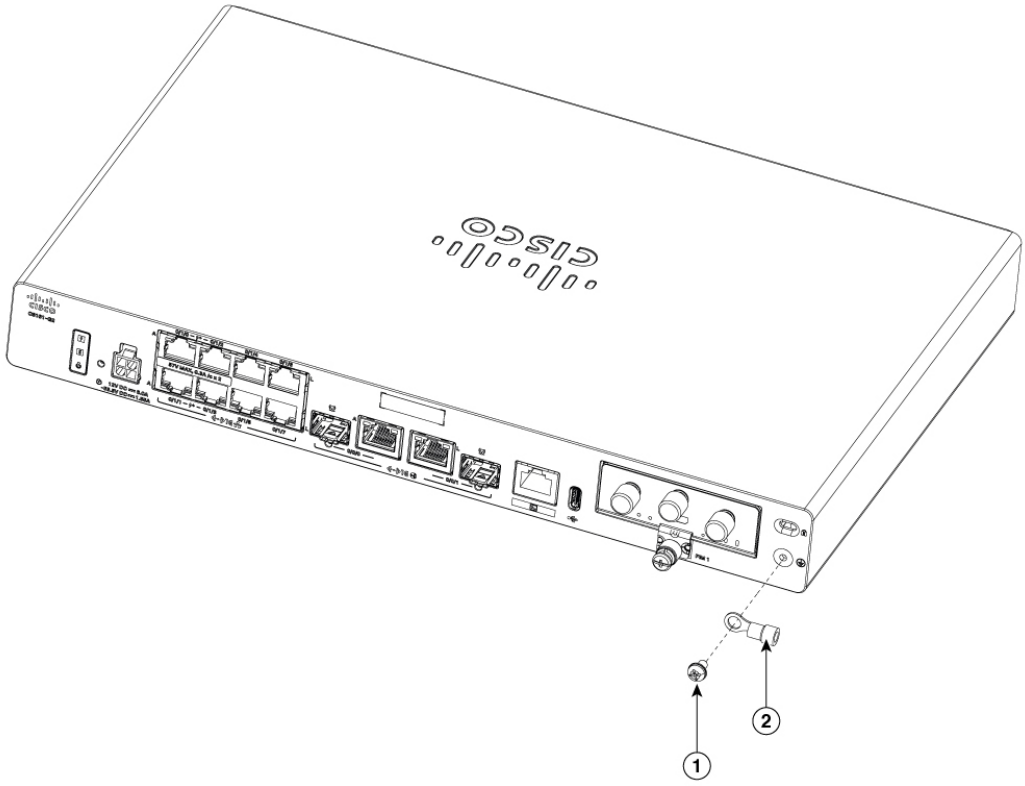
1	Screw (UNC 6-32)
2	Ground lug

Figure 44: Chassis ground connection - C8140-G2



1	Screw (UNC 6-32)
2	Ground lug

Figure 45: Chassis ground connection - C8151-G2 and C8161-G2



1	Screw (UNC 6-32)
2	Ground lug

Optical connection SFP warnings

Take note of the following optical connection warnings:

Warning **Statement 1051—**Laser Radiation

Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.

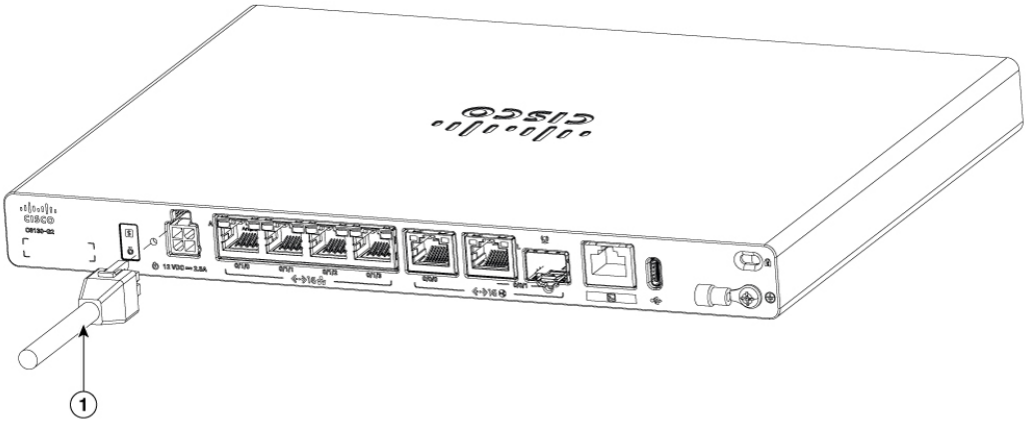
Connect the power cable

Power supply of the Cisco 8100 Series Secure Routers is an external AC to DC power adapter. The external DC power connector plugs into the router's 4 points power connector.

The router does not have a power button. Refer the following to Power on/off the Router:

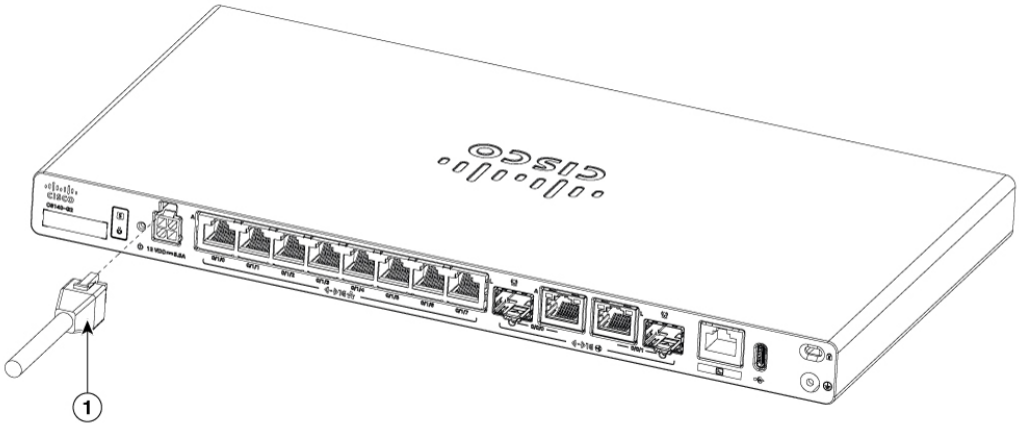
- To power on the router – you can locate the power cable and connect it to a power source.
- To power off the router – unplug the power cord from the back of the router or gently pull the power cable from the router or the wall outlet.

Figure 46: Power cable - C8130-G2



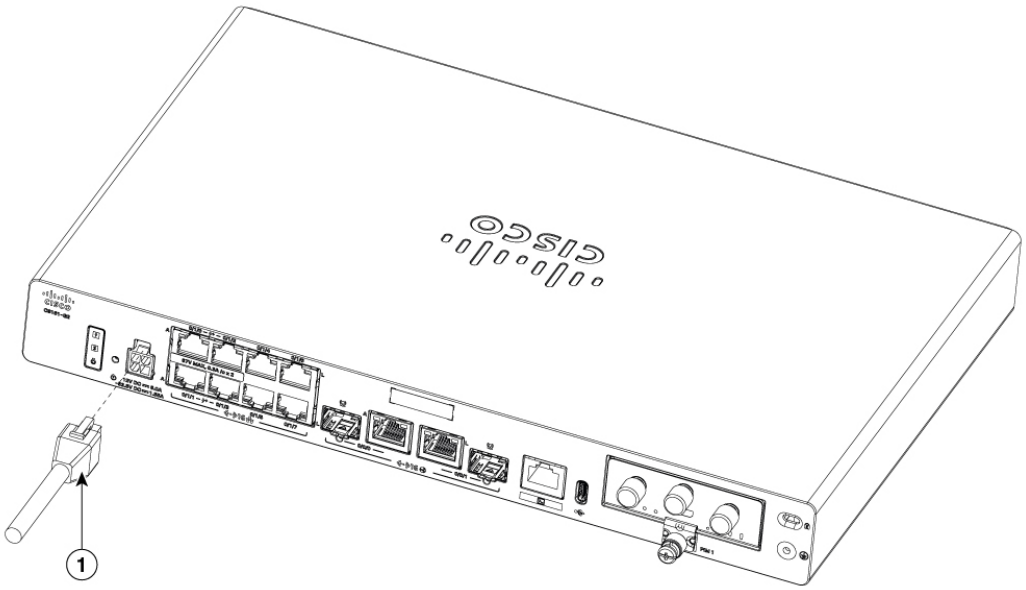
1	Power cable

Figure 47: Power cable - C8140-G2



1	Power cable

Figure 48: Power cable - C8151-G2 and C8161-G2



1	Power cable

Connect the router to a console

The Cisco 8100 Series Secure Routers contains a RJ45 console port. This port provides administrative access to the router through a console terminal or a PC.

Use the RJ45 console port on the router to access the Cisco Internetwork Operating System (IOS XE) command line interface (CLI) on the router and perform configuration tasks. A terminal emulation program is required to establish communication between the router and a PC.

To configure the router through the CLI, you must establish a connection between the router console port and either a PC or a terminal.

Use the following cables and adapters to establish a local or remote connection.

Table 6: Local and remote connections

Port type	Cable	Action
Serial (RJ45)	RJ45 serial console cable	Connecting to the serial port with terminal emulation program.

Connect to the Serial Port with Microsoft Windows

This procedure describes how to connect a Microsoft Window USB port to a console port.

Before you begin

To establish a physical connectivity between the router and a PC, you need to install a Microsoft Windows USB.

Procedure

Step 1 Connect the end of the console cable with the RJ45 connector to the light blue console port on the router.

Step 2 Connect the end of the cable with the DB-9 connector (or USB Type-A) to the terminal or PC. If your terminal or PC has a console port that does not accommodate a DB-9 connector, you must provide an appropriate adapter for that port.

Step 3 Start a terminal emulator application to communicate with the router. Configure the software with the following parameters:

- 9600 baud
- 8 data bits
- no parity
- 1 stop bit
- no flow control

Connect to the console port with Mac OS X

This procedure describes how to connect a Mac OS X system USB port to the console using the built in OS X Terminal utility.

Procedure

Step 1 Use the Finder to go to Applications > Utilities > Terminal.

Step 2 Connect the OS X USB port to the router.

Step 3 Enter the following commands to find the OS X USB port number

Example:

```
macbook:user$ cd /dev
macbook:user$ ls -ltr /dev/*usb*
crw-rw-rw-  1 root    wheel       9,  66 Apr  1 16:46 tty.usbmodem1a21 DT-macbook:dev user$
```

Step 4 Connect to the USB port with the following command followed by the router USB port speed

Example:

```
macbook:user$ screen /dev/tty.usbmodem1a21 9600
```

To disconnect the OS X USB console from the Terminal window

Enter Ctrl-a followed by Ctrl-\

Connect to the console port with Linux

This procedure shows how to connect a Linux system USB port to the console using the built in Linux terminal utility.

Procedure

Step 1 Open the Linux terminal window.

Step 2 Connect the Linux USB port to the router.

Step 3 Enter the following commands to find the Linux USB port number.

Example:

```
root@usb-suse# cd /dev
root@usb-suse /dev# ls -ltr *ACM*
crw-r--r--    1 root     root     188,   0 Jan 14 18:02 ttyACM0
root@usb-suse /dev#
```

Step 4 Connect to the USB port with the following command followed by the router USB port speed.

Example:

```
root@usb-suse /dev# screen /dev/ttyACM0 9600
```

Note
To disconnect the Linux USB console from the terminal window:

Enter Ctrl-a followed by : then quit.

Connect WAN and LAN interfaces

This section describes how to connect WAN and LAN interface cables.

Ports and cabling

This section summarizes typical WAN and LAN connections for Cisco 8100 Series Secure Routers. The connections summarized here are described in detail in the Cisco Modular Access Router Cable Specifications document on cisco.com.

Table 7: WAN and LAN connections

Port	Port Type	Connection	Cable
Ethernet	RJ45	Ethernet hub or Ethernet switch	Category 5 or higher Ethernet
Gigabit Ethernet SFP, optical	LC	1000BASE-SX, -LX, -LH, -ZX, -CWDM	Optical fiber as specified on applicable data sheet
Gigabit Ethernet SFP, copper	RJ45	1000BASE-T	Category 5, 5e, 6 UTP

Connection procedures and precautions

After you have installed the router chassis, perform these steps to connect the WAN and LAN interfaces:

Procedure

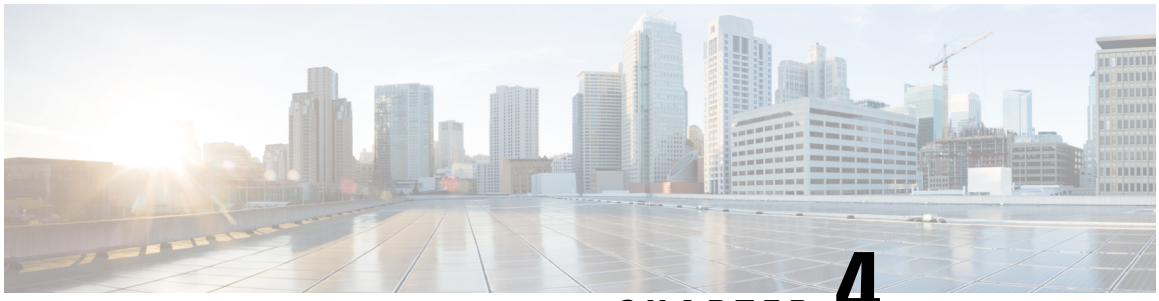
Step 1 Connect each WAN and LAN cable to the appropriate ports on the chassis.

Step 2 Position the cables carefully so that you do not strain the connectors.

Step 3 Organize cables in bundles so that cables do not intertwine.

Step 4 Inspect the cables to make sure that the routing and bend radius is satisfactory. If necessary, reposition the cables.

Step 5 Install cable ties in accordance with site requirements.



CHAPTER 4

Install and upgrade Field Replaceable Units

The Cisco 8100 Series Secure Routers consist of Field-replaceable Units (FRUs) that can be quickly and easily removed and replaced if there is a need to do so. This section describes how to install the FRUs in the Cisco 8100 Series Secure Routers. The information is provided in the following sections:

Install a Pluggable Interface Module

Before you begin

Warning **Statement 1255**—Laser Compliance Statement

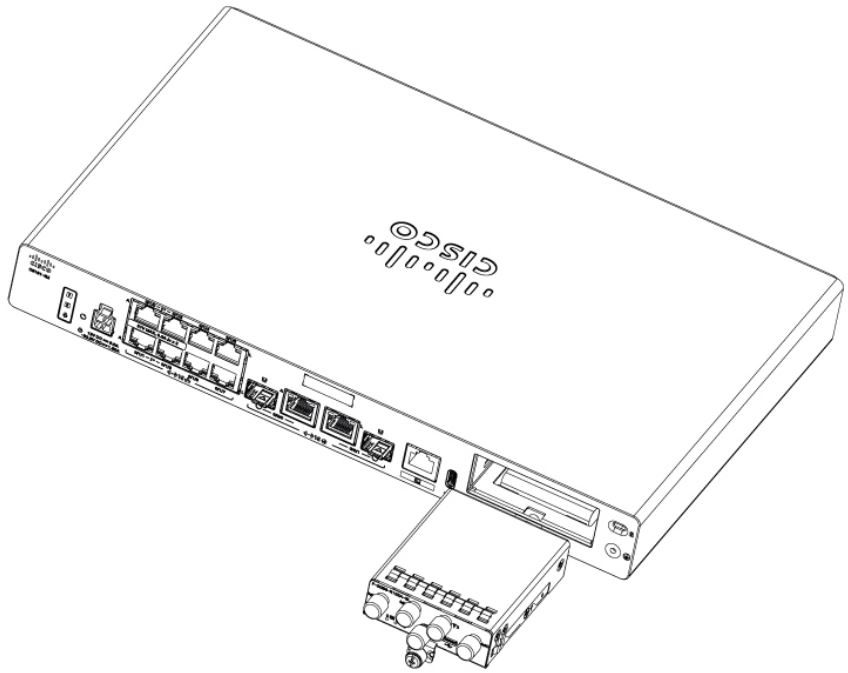
Pluggable optical modules comply with IEC 60825-1 Ed. 3 and 21 CFR 1040.10 and 1040.11 with or without exception for conformance with IEC 60825-1 Ed. 3 as described in Laser Notice No. 56, dated May 8, 2019.

Procedure

Step 1 Insert and then gently push the Cellular pluggable into the pluggable slot of C8151-G2 or C8161-G2 until firmly fixed.

Example:

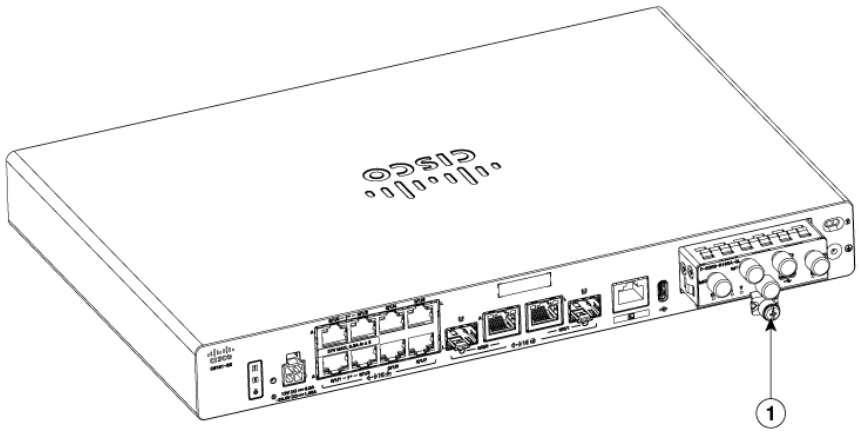
Figure 49: Pluggable Interface Module installation for C8151-G2 and C8161-G2



Step 2 Tighten the screw, the recommended torque is 10-12 in-lb.

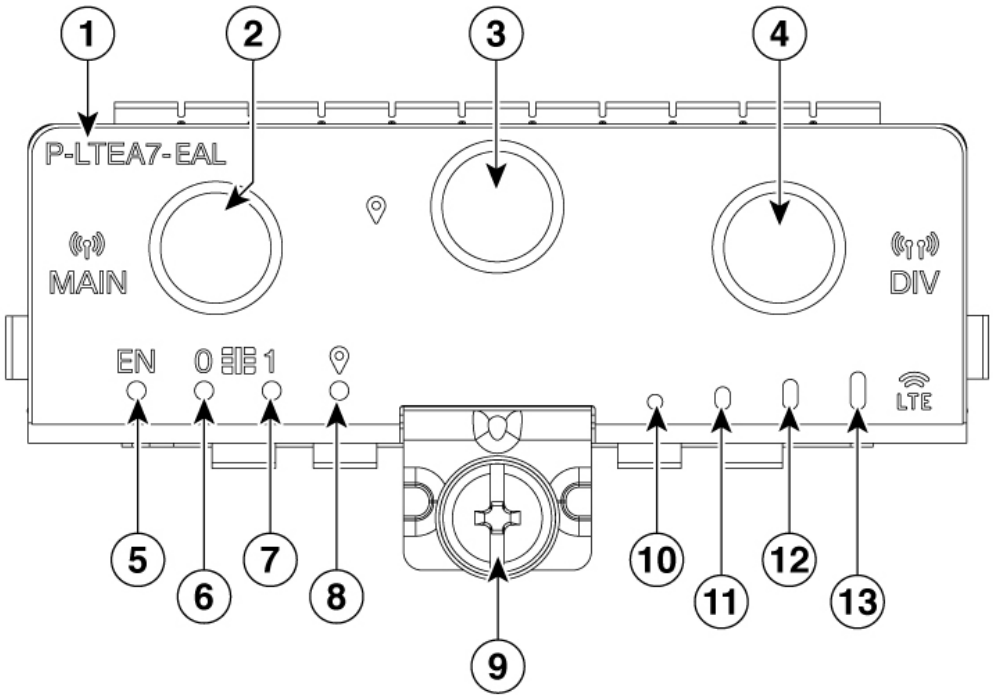
Example:

Figure 50: C8151-G2 and C8161-G2 with attached Pluggable Interface Module



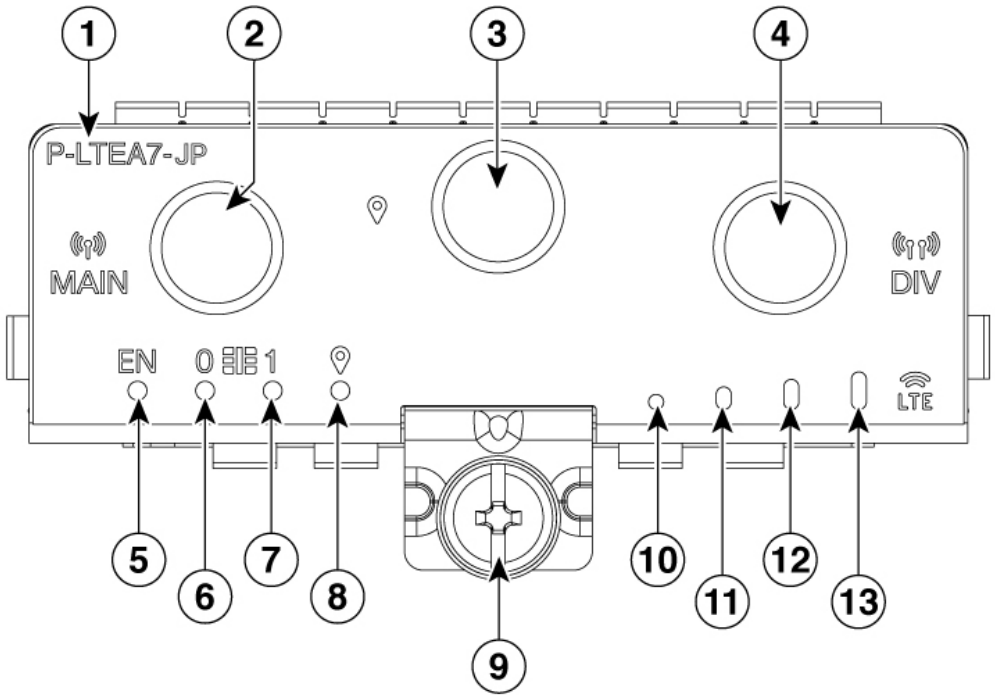
1	Screw

Figure 51: LTE Pluggable Interface Module - P-LTEA7-EAL



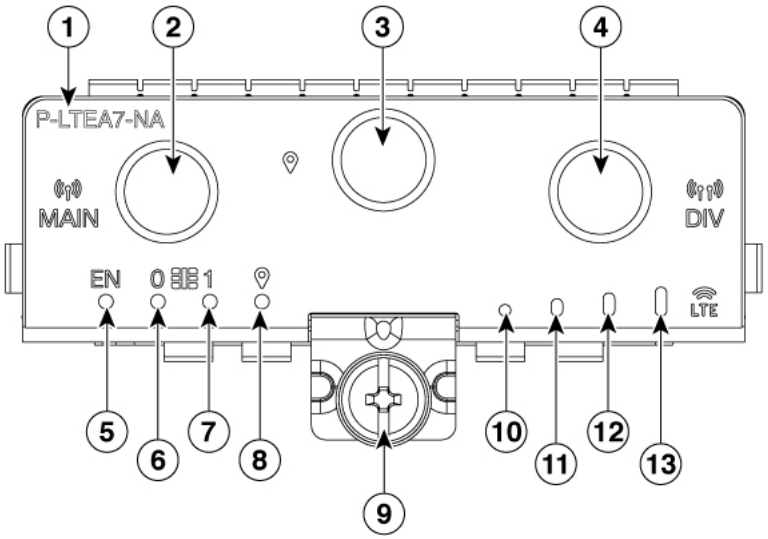
1	Product Identification Number (PID)
2	Main antenna connector (SMA)
3	GPS connector (SMA)
4	Diversity antenna connector (SMA)
5	Enable LED
6	SIM 0 LED
7	SIM 1 LED
8	GPS LED
9	M3.5 thumbscrew
10	RSSI 0
11	RSSI 1
12	RSSI 2
13	RSSI 3

Figure 52: LTE Pluggable Interface Module - P-LTEA7-JP



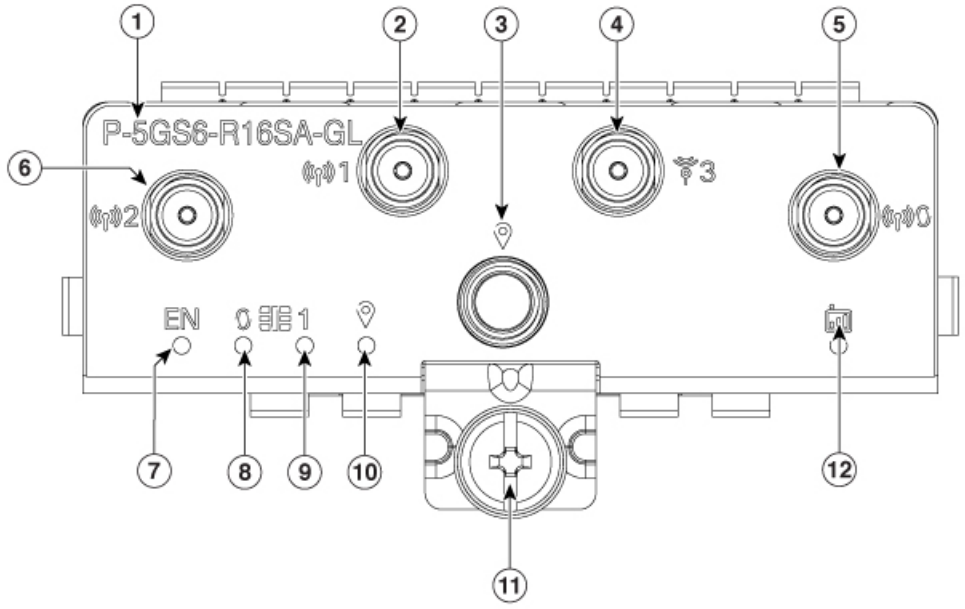
1	Product Identification Number (PID)
2	Main antenna connector (SMA)
3	GPS connector (SMA)
4	Diversity antenna connector (SMA)
5	Enable LED
6	SIM 0 LED
7	SIM 1 LED
8	GPS LED
9	M3.5 thumbscrew
10	RSSI 0
11	RSSI 1
12	RSSI 2
13	RSSI 3

Figure 53: LTE Pluggable Interface Module - P-LTEA7-NA



1	PID
2	Main antenna slot (SMA)
3	GPS (SMA)
4	Diversity antenna slot (SMA)
5	Enable LED
6	SIM 0 LED
7	SIM 1 LED
8	GPS LED
9	M3.5 thumbscrew
10	RSSI 0
11	RSSI 1
12	RSSI 2
13	RSSI 3

Figure 54: 5G Pluggable Interface Module - P-5GS6-R16SA-GL



1	PID
2	Main antenna slot 1 (SMA)
3	GPS (SMA)
4	Antenna slot 3 (SMA, reception only)
5	Antenna slot 0 (SMA)
6	Antenna slot 2 (SMA)
7	Enable LED
8	SIM 0 LED
9	SIM 1 LED
10	GPS LED
11	M3.5 thumbscrew
12	Service LED

Insert antenna into the Pluggable Interface Module

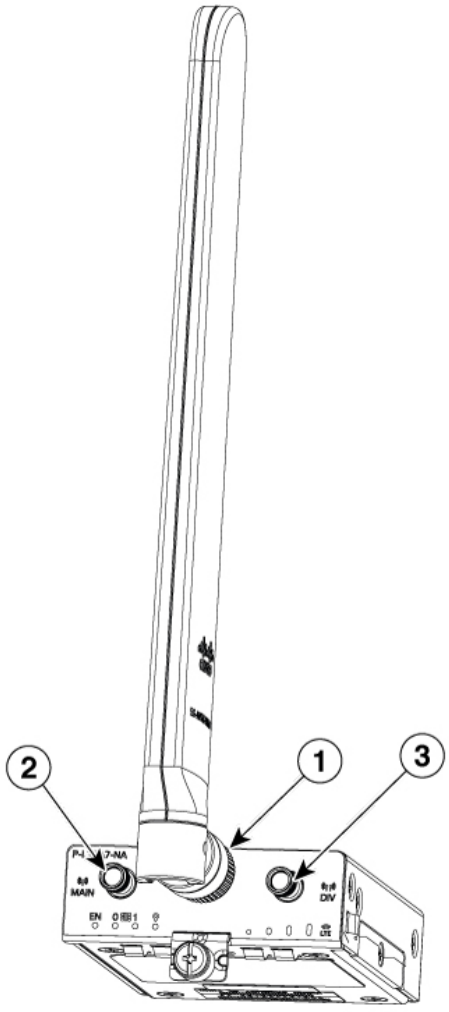
To insert the antenna in the Pluggable Interface Module, perform the following steps:

Procedure

Step 1 Insert and tighten antennas in the antenna slots as per the sequence mentioned in the figure.

Example:

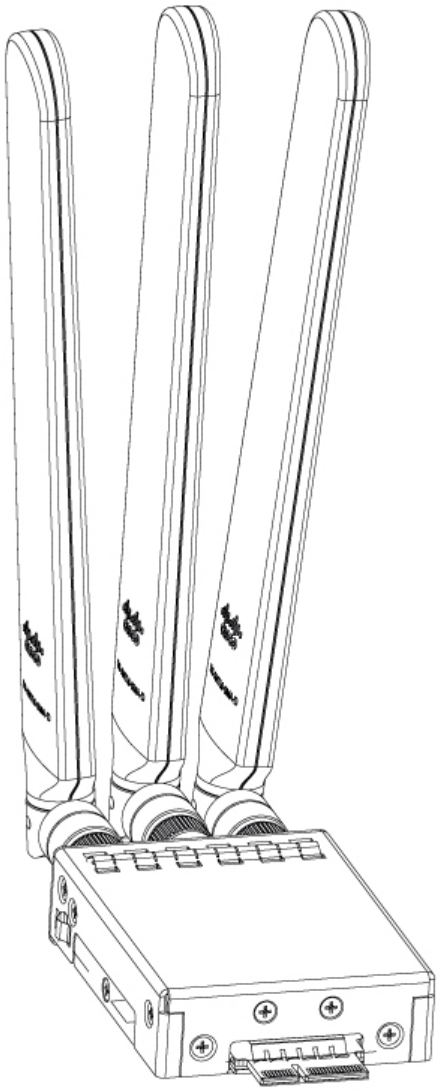
Figure 55: Attaching the antennas



Note
You need to install antennas as per the sequence to get enough space to tighten antennas in all the antenna slots.

Step 2 After installing the antennas, adjust the antenna orientation by spacing out each of them equally until they are spread out. This is significant as it helps in getting higher RF performance.

Example:



RF band mapping for antenna ports

The following table lists the RF band mapping for antenna ports.

Table 8: RF band mapping for antenna ports for P-5GS6-R16SA-GL

Radio Access Technology (RAT)	Bands	Tx antennas		Rx antennas			GNSS antenna

Radio Access Technology (RAT)	Bands	Tx antennas		Rx antennas				GNSS antenna
		Default	Alternate Path	ANT0	ANT1	ANT2	ANT3	GPS
5GNR Sub-6G	29	-	-	Y	-	Y	-	-
	38, 41	ANT2	ANT0	Y	Y	Y	Y	-
	48	ANT3	ANT1	Y	Y	Y	Y	-
	75, 76	-	-	Y	Y	Y	Y	-
	77, 78	ANT3	ANT1 ANT2	Y	Y	Y	Y	-
	79	ANT3	ANT1	Y	Y	Y	Y	-
LB LTE/ 5GNR Sub-6G	5, 8, 12, 13, 14, 17, 18, 19, 20, 26, 28, 71	ANT0	-	Y	-	Y	-	-
MB/HB LTE/ 5G NR Sub-6G	1, 2, 3, 4, 7, 25, 30, 39, 40, 66, 70	ANT0	-	Y	Y	Y	Y	-
LTE	29	-	-	Y	-	-	Y	-
	34	ANT0	-	Y	-	Y	-	-
	46	-	-	Y	-	-	Y	-
	32	-	-	Y	Y	Y	Y	-
	38	ANT0	-	Y	Y	Y	Y	-
	41	ANT0	ANT2	Y	Y	Y	Y	-
	42, 43, 48	ANT3	ANT1	Y	Y	Y	Y	-
WCDMA	1, 2, 4, 5, 8, 19	ANT0	-	Y	-	Y	-	-
GNSS	-	-	-	-	-	-	-	L1

LED behaviors

The following table lists the LED indicators and their behavior. The LEDs provide a visual indication of the status and the currently selected services.

LED indicators

LED	Color	Function
EN	Green, Yellow	**Enable LED** • Off: Cellular module power is off • Yellow: Module power is not functioning correctly • Green: Module power is on
SIM0	Green, Yellow	**SIM0 LED** • Off: SIM0 is not installed • Yellow: SIM0 is installed, but not active • Green: SIM0 installed and active • Green Blink: Cellular data activity
SIM1	Green, Yellow	**SIM1 LED** • Off: SIM1 is not installed • Yellow: SIM1 is installed, but not active • Green: SIM1 installed and active • Green Blink: Cellular data activity
GPS	Green, Yellow	**GPS LED** • Off: GPS is not configured • Yellow: Software is defined • Green: GPS is configured • Green Blink: GPS is functional

LED	Color	Function
Service	Green, Yellow, Blue	**Service indication LED (applicable for P-5GS6-R16SA-GL)** • Yellow: 3G • Green: 4G LTE • Blue: 5G
RSSI	Green, Yellow	**RSSI LED (applicable for P-LTEA7-NA, P-LTEA7-JP, P-LTEA7-EAL)** • Green: 4G, LTE • Yellow: 4G
		RSSI 0 • Yellow: Very bad signal, 3G • Green: Very bad signal, 4G
		RSSI 1 • Yellow: Bad signal, 3G • Green: Bad signal, 4G
		RSSI 2 • Yellow: Good signal, 3G • Green: Good signal, 4G
		RSSI 3 • Yellow: Best signal, 3G • Green: Best signal, 4G

Insert Micro-SIM into a Pluggable Interface Module

This section describes how to insert a Micro-SIM card into a Cellular Pluggable Module. To insert the Micro-SIM cards into a Cellular Pluggable Module, follow these instructions:

Procedure

Step 1 Place the pluggable module on its bottom side, remove the SIM door screw, use a #1 Philips screwdriver for removing the screws, and then carefully remove the Micro-SIM cover from the pluggable module.

Note
Ensure to use the correct tool for removing the Micro-SIM door.

Step 2 Slot 1 and slot 0 are the Micro-SIM slots.

Caution
Do not touch any part of the exposed PCB circuit area when the Micro-SIM cover is removed.

Step 3 Install SIM 0 and SIM 1 in their respective slots. SIM 0 or SIM 1 is marked on the pluggable interface module above the Micro-SIM cover. The SIM icons show the correct orientation required to install the SIM into each respective connector (SIM connectors are a push-push type). To install, insert the SIM card in the connector until you feel it click, then let go and the SIM is locked to the connector. To remove the SIM card, depress the SIM in the connector slot again until you feel the same click and let it go; the SIM connector should eject part way out of the connector. The SIM card can then be grabbed and removed. Secure the Micro-SIM cover with a screw, use a number 1 Philips screwdriver to secure the screw on the Micro-SIM cover. The recommended torque is 2.8 - 3.8 inch LBF.

Note
We recommend using industrial-grade SIM cards.

Step 4 You have now successfully inserted the Micro-SIM cards into the Cellular pluggable module. The marking on the Mirco-SIM door should align with Micro-SIM 0 on the pluggable module with the arrow pointing upward.

Example:

Figure 56: Insert the Micro-SIM cards